BUSINESS FORECASTING

& ITS PRACTICAL APPLICATION

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BUSINESS FORECASTING
AND ITS PRACTICAL APPLICATION

BY

WILLIAM WALLACE, B.Com. (Lond.)
SCOTT SCHOLAR
ECONOMIC ADVISER TO MESSRS. ROWNTREE AND CO., LTD.

WITH AN INTRODUCTION BY
W. T. LAYTON, C.H.
EDITOR OF "THE ECONOMIST"

UNIVERSITY COLLEGE NOTTINGHAM

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TO

N. E. W.

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PREFACE

THIS book must be judged in the light of its limited objective. It is not the product of the study, either literally or metaphorically. It has been written in the spare moments of a busy business life, and it deliberately avoids any abstruse discussion of economic and statistical problems. What I have attempted to do has been to act as a *liaison* officer between the academic and the business worlds. I have sought, first, to describe in homely terms those complex theories relating to the trade cycle, upon which general trade forecasting is primarily based; and secondly, to show in as concrete a manner as possible how far existing knowledge on trade forecasting can be used by the business man in the practical conduct of his affairs.

I have thought that perhaps a somewhat unorthodox career may have equipped me in some measure for my rôle of intermediary. On the one hand, in addition to some knowledge of economics, I have been trained in ordered and objective thinking, and have had experience in the practical work of research in different fields. On the other hand, I have had twenty years of contact with practical business problems in very varied aspects; beginning with some years of commercial legal practice, including (if without offence I may, quite properly, use such a word in such a context!) some inside experience of the working of government departments; and concluding with eight years in an administrative capacity in a large manufacturing business. During the latter part of that time I have been responsible for an Economic and Business Research Department. I have felt, therefore, that in these circumstances it might be worth while my attempting to translate the theories of the economist and the statistician on this subject into terms of everyday business. It will be for readers to say how far I have succeeded. One word only would I say before they pronounce judgment. It is that, so far as I am aware, this is the first attempt made quite along these lines. It is inevitable, therefore, that there will be both mistakes and omissions. I hope that readers will be kind enough to put any such before me. In that way we shall be co-workers in a research which has for its object better business for all.

For permission to reproduce various charts, I have to express my acknowledgments to the London and Cambridge Economic Service, the Harvard Committee on Economic Research, the Brookmire Economic Service, the Babson Statistical Organization, and to the Joint Committee on Standards for Graphic Presentation, and their Chairman, Mr. Willard C. Brinton, of the American Society of Mechanical Engineers, for permission to include in Appendix II their valuable suggestions on graphic presentation.

My thanks are particularly due to Mr. B. Seebohm Rowntree, Alderman J. Bowes Morrell, Mr. T. T. Rush, my assistant, and my brother, Mr. C. G. Wallace, for having read the manuscript and made valuable criticisms, and to my secretary, Miss Lilian Tait, for other help in connection with its preparation. I am also much indebted to Mr. W. T. Layton for his Introduction.

WILLIAM WALLACE

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INTRODUCTION

Those who are in close touch with the business world sometimes come across the type of man who seems to have an uncanny instinct for a bargain—a sort of sixth sense which tells him when to buy and when to sell. These men, who usually make their fortunes—unless this instinct betrays them on some particularly important occasion—will have little use for Mr. Wallace's book. They are the weather-wise, who "feel" in advance whether it is going to be wet or dry.

But for the ordinary man who considers himself fortunate if his correct decisions are more numerous than his mistakes, Mr. Wallace's explanation of how "business barometers" may be used in practical day-to-day business, will be of the greatest value. The case as stated by Mr. Wallace really needs no embellishment. He does not make any extravagant claims for the nascent science of business forecasting. It is still in the pioneer stage, and in a world where such profound and unexpected changes occur as those which we have experienced in the last dozen years, it is much less true than usual that economic history can be relied upon to repeat itself mechanically, or that we can foresee the future accurately from our experience of the past. At the same time, anyone who follows the methods developed in Mr. Wallace's book will have achieved two things. On the one hand he will make himself acquainted with the normal sequence of events in the economic world and with the effects which follow from certain well defined causes; and, on the other, he will develop the habit of passing under review current conditions in the whole economic world. In other words, instead of judging the future entirely in the light of the conditions which immediately surround him, he will find himself equipped with a general knowledge of the laws of economic meteorology, and with a current record of the state of the weather over the whole economic field. As Mr. Wallace rightly remarks, every business man is bound to be making forecasts every day. With the equipment which is now at his disposal, he should be able to make those forecasts with more frequent success than when he merely follows the light of nature.

It is hardly necessary to emphasize the practical importance of this claim to the individual business man, if it can be substantiated. Even in those industries which seem to depend most upon technical efficiency or sound organization, there are certain to be moments when success depends upon a correct judgment of the future—whether it be a matter of sales policy, the expansion of the business, or the purchase of material. A railway company, for example, may easily fritter away the results of months of effort to economize in administration, by a few ill-timed contracts for coal. In many manufacturing industries the importance of wise foresight is of equal, or even greater importance, than industrial technique. The prizes that may be won by successful forecasting are, however, not more striking than the penalties that may sometimes have to be paid for misjudgment. We had one of the most remarkable illustrations of this in the slump which followed the boom of 1920. That boom affected most industries of the country; but none so violently or so foolishly as shipping. Those who took the long view and sold their ships in time, made their fortunes; those who thought the boom would go on for years ended in bankruptcy. Yet the portents were clearly visible, from 1918 onward, for anyone to see who was capable of taking a general all-round view. Months before the end of the war, the Ministry of Shipping had collected together a few facts which pointed irresistibly to the conclusion that after twelve months or so the world would be in possession of a shipping tonnage greatly in excess of the reduced amount of sea transport that would have to be done—when once the armies had been demobilized and overseas troops taken to their distant homes. To anyone accustomed to take a wide view, only one conclusion was possible. Yet many believed that the demand for ships would expand indefinitely. The difference between the two views meant fortune or failure.

The study of business forecasting is, however, of interest not only to the business man as an individual; it is of great national importance. If employers, merchants and traders—the people who take the initiative in the economic world—are better informed about world conditions and the demand for their products, and are therefore able to foresee a little better the ups and downs of trade and provide for them, they will inevitably diminish those ups and downs considerably. There is some ground for the generalization that before the war the period of the trade cycle was tending to become shorter, and the extent of its movements smaller, largely as a result of a better understanding of these movements. The economic history of the world since 1918—in spite of the great disturbances that have occurred—suggests that we may be even more successful in the future than in the past in modifying the trade cycle as a result of greater knowledge. In America, in particular, where statistical knowledge is more widespread than elsewhere, it seems that any disproportion between production and consumption, or between the progress of different industries, is more quickly corrected than used to be the case. Any modification of the trade cycle which may be brought about in this way is the best possible means of restricting those recurrent periods of unemployment which have had such harmful effects in the past.

It will be a very long time before business forecasting becomes an exact science. As yet we have not even reached an agreed interpretation of the course of events either in the distant or the recent past. Many of us, for example, would differ from Mr. Wallace and Mr. McKenna as to the part which banking policy played as a cause of the economic depression of 1921 and the following years. No one would deny that the policy of the banks and of the Treasury affected prices, but there is room for the view that other causes, both at home and abroad, were of considerably greater importance. Such differences of opinion, however, only prove that the study of business conditions is in an early stage. They do not prove that it is a useless or merely academic pursuit. If there has recently been some tendency to disparage it in America, it is perhaps because this new technique has been expected to do too much, and the event has sometimes belied the prognostications of those who have treated it as though it would furnish results with mechanical accuracy. Perhaps the greatest merit of this book is that it sets out the limitations as well as the merits of the apparatus which it describes, and clearly shows the business man in what way it may be applied to his particular daily problems.

W. T. LAYTON

BUSINESS FORECASTING
AND ITS PRACTICAL APPLICATION

CHAPTER I

THE NEED FOR BUSINESS FORECASTING

PRACTICAL Business Forecasting is a recent development. So far as Great Britain is concerned, it may, indeed, be regarded as another of the unexpected by-products of the war, in the sense that it was the tremendous losses incurred in the post-war slump which led business men to explore its practical possibilities. Discussions relating to it display two characteristics usual in the case of any development in the world of ideas. On the one hand, its sponsorstend to make too extravagant claims on its behalf. On the other hand, the practical man tends to dismiss it too summarily as only another impracticable " stunt." The purpose of this little book is to discuss just how far and in what way business forecasting can help in the day-to-day management of business.

That British business cannot afford to neglect any aid to greater efficiency will surely be common ground. To discuss in detail the causes of our present unsatisfactory business and industrial situation, and the probable speed and extent of recovery, would be to go quite beyond the scope of this book. It will be generally agreed, however, that when all our temporary difficulties have passed away, we shall find the successful conduct of British industry more difficult than before the war. In particular, our customers have learned to do many things for themselves which they previously paid us to do for them ; and have protected the resulting industries with tariff walls difficult to surmount. If, therefore, we are to regain our pre-war volume of trade, and still more if we are to improve upon it, we can only do so in proportion as we are relatively more efficient than our competitors. This means, in turn, that we must approach with an open and hopeful mind every development which claims to assist toward that end. Britain will advance only in so far as she gives up the 1913 mind.

Let us, then, endeavour to consider impartially how we, in our different businesses, can hope to benefit from a systematic forecast of business conditions. If, as is probable, we are somewhat sceptical (which in itself is possibly a healthy attitude of mind), let us remember that many of us have been equally sceptical about costing, planning, routing, functional organization, budgeting, and other things which are beginning to be generally accepted now by enlightened men as essential to the efficient conduct of industry.

The attitude of mind of the natural man towards business forecasting can probably be summed up in the words, " You might as well try to forecast the weather ! " Isn't the answer to this that we do try to forecast the weather ? We know that, particularly in our climate, the weather cannot be forecasted for any substantial period of time with certainty ; yet surely a scientific forecast with a certain margin of error is better than no forecast at all ? We act on this belief. We " listen-in " to the official forecast. The farmer decides to cut his hay on the strength of it ; and is agreeably surprised at its degree of accuracy. The theme of this book will be to suggest that while at present the vast complex of business cannot be forecasted for very far ahead, nor with complete accuracy, yet, consciously or unconsciously, every one in business must continually be forecasting, and a careful and systematic forecast, based on certain dependable principles, is likely to be a more certain guide than our feelings of the moment.

That, indeed, is the main point of this chapter. We do forecast. We must forecast. We cannot take any single important action in our business lives without forecasting. The history of civilization is the history of the growth of forecasting. A savage may be defined as a man who does not forecast! He has little sense of time. The past and the future have little meaning for him. He lives in the present; literally from hand to mouth. When primitive man first plants a crop, he has begun to forecast. He has calculated that there are reasonable grounds for believing (1) that soil and weather conditions will be such as to produce a harvest; (2) that that harvest will be such as to make his labour worth while; (3) that he will in this way obtain the best return for a given amount of labour; (4) that he will be able to maintain himself until harvest; (5) that he will be able to reap his harvest without molestation; and so on.

This is, however, a very simple illustration. Whatever case there was for forecasting a century ago has been multiplied a hundredfold since. The whole world is now a highly-organized economic whole. The type of monsoon in India must directly affect the trade of Lancashire some months after, and with it the whole trade of Great Britain. The decision of a bankers' meeting in Wall Street may precipitate trade depression throughout the civilized world. The discovery of a new goldfield may alter the prospects of every business and the value of every investment. While all this makes forecasting proportionately more difficult, it makes it also proportionately more necessary. To say that because the future is difficult to foresee we should give up all attempts to foresee it, is a counsel of despair. A man holding such a view should retire at once while he still has something on which to retire! We must forecast or fail. Besides, whilst the economic world is so complex, careful analysis shows that there are certain fundamental movements which are comparatively simple and which offer some guidance through the maze of business changes.

We would sum up, therefore, by suggesting that every man or woman in business must forecast; and that such forecast must be based upon statistics (by whatever name they may be called). Every man who lives by selling goods, whether in a vast departmental store or in a village shop, if he is to be successful, must not only foresee the probable tastes of his customers, but must assess their probable purchasing power. This will depend upon their numbers and their income per head; and the latter in turn will depend upon the general state of trade. Every buyer of goods must not only know the quality and characteristics of the article he buys, but must make an estimate of the probable course of its price. This, in turn, requires consideration of the probable supply of the article, the rate at which that supply will be increased or diminished as a result of a change in price, the demand for the article, and the extent to which that will be stimulated or checked by a reduction or increase in price respectively, the existing stocks, the possible substitutes, and the purchasing power of potential purchasers, leading again to the same ultimate inquiry into general trade prospects. Every manufacturer must estimate not only his position in relation to his competitors, but the probable price of his raw materials, the probable level of wages, the probable volume of his sales, the extent to which he must advertise, and so on. Until he does so, he cannot properly determine his price, his purchases, or his scale of production. He, in turn, therefore, in addition to other forecasts, must forecast general trade conditions. We could similarly add to the list the banker, the ship-owner, the investor, and so on, right through the whole economic life of the nation. As Mr. William T. Foster says, in his introduction to *The Problem of Business Forecasting* (referred to in Appendix I)—

> . . . when a man enters business, he enters a forecasting profession. He may forecast badly or well, but forecast he must. He may scorn business forecasters, but he cannot help being one. He may shun statistics, but he cannot help using them. Since business is essentially risk-taking with the expectation of profits, every enterpriser must run risks; and, as a risk-taker, he is necessarily a business forecaster.

We must all forecast. We should therefore seek to secure all the aid we can in making our forecasts as accurate as may be. That accuracy can scarcely be 100 per cent ; but it is better to be 80 per cent accurate than 50 per cent.

It is proposed therefore in the following pages to consider the theories so far developed on general trade forecasting, to inquire how far these have stood the test of events, and how far, if at all, dependable guidance can be found here in making our necessary forecasts of general business conditions. We shall then proceed to consider in more detail the forecasting of sales, the forecasting of future prices of goods, and other matters. Our aim throughout will be not to develop abstruse theories on trade forecasting, but to provide an introduction to the subject which may be of some practical use to business men in their everyday affairs. At the same time, the book may also serve as an introduction to the more serious pursuit of the subject by the student.

CHAPTER II

THE PROBLEM STATED

In order to make our treatment of the subject as practical as possible, let us look at it through the eyes of an ordinary business man. Further, let us take for this purpose a manufacturer producing a proprietary article and selling direct to the retailer, because he covers the activities both of the manufacturer and the merchant.

Let us assume such a manufacturer towards, say, the end of a calendar year, looking into the future. He is interested, if we may so put it, in the immediate foreground, the middle distance, and the far horizon.

As regards the first, he asks himself what are likely to be his sales during the next three months? Is his current rate of production, together with his existing stocks of finished goods, likely to be sufficient to guarantee suitable delivery, or should he increase his staff, and his purchases, and build up his stock further? Turning to the middle distance, what are likely to be his total sales during the next twelve months? If he is making use of the latest ideas in business, he will wish to prepare a formal "budget," for the coming year, based on a definite "sales quota"; which, in turn, will determine the whole of his purchasing, production, and finance for the year. But even if he is not yet prepared to accept this recent development in full, yet he will still desire to arrive at some conclusion as to his probable sales, in order that he may calculate his fixed or overhead charges per unit of product. With a certain sum for materials and direct labour per car, a motor manufacturer can produce, say, 10,000 cars in the coming year, at a certain price. If he sees his way to sell more cars than this, he can reduce his price per car, which will in turn increase his probable sales. Shall he budget for 20,000; or on what figure shall he fix?

Finally, our manufacturer must form some conclusion as to the probable long-period growth of his business, in order that he may be guided on the broad lines of policy which he should follow with regard to business expansion. If his business has grown rapidly during the last few years, is this growth likely to continue, and if so, at what rate ? Shall he plan to double his capital, his buildings and plant, or is the recent rapid increase in his sales only a temporary phase ? If his sales have been falling off, is this due to a temporary recession in general business prosperity, or does it denote a change in taste or conditions pointing to the wisdom of developing other lines of product ? What, in short, is the outlook ?

In these circumstances, the manufacturer will naturally turn in the first place to his own records showing the history and present position of his business. Foresight is said to be 90 per cent hindsight ; and, short of the gift of prophecy, the only way to forecast the future is to consider what, in similar circumstances, happened in the past. At first sight, his figures may convey little ; may, indeed, seem to disclose no intelligible trend whatever, and therefore throw no light on the future. A little simple statistical treatment should, however, help matters.

In the first place, it will be wise to turn the raw figures of sales into index figures. They will then be more easily grasped and more simply handled. The essential point is not that sales increased last year by £58,793 10s. 5d., but that they increased approximately by 5 per cent. In so translating the figures, the first thing is to select some period as a base, to be called 100. The exact base will depend upon circumstances and preferences. We may take the first year or the last year for which figures are available ; or we may take the middle year, or the year in which the present management was appointed, or the first year after the war which we think can be regarded as normal ; and so on. It is a question of expediency. Suppose we have figures of sales per quarter for a number of years, we may take the first quarter as 100 and express every subsequent quarter as a percentage of the first. If, therefore, the sales in the first four quarters were £100,000, £110,000, £90,000, and £100,000, the new index figures would be 100, 110, 90, and 100 respectively. In passing, one may mention that if any substantial number of calculations have to be made, the necessary labour can be immensely reduced by the use of an appropriate calculating machine.

Suppose, now, we have such sales figures and have turned them into index figures. We have next to consider whether it is necessary to modify them in the light of price changes which have occurred during the period. What we are trying to get at is an estimate of sales in quantities, and not in money. We have merely taken the values of sales because usually there is no appropriate single unit of quantity which can be used. It is obvious that if during the period there has been an altogether abnormal rise or fall in the price level (such as has occurred since 1914), some adjustment must be made. If, say, in 1920, sales doubled in value but prices doubled also, quantities remained the same, and the corresponding index figures should accordingly be halved. The method of adjusting the prices in this way, and the selection of the price index number to be taken as our standard, are matters calling for considerable judgment and some statistical knowledge.

We therefore have the index figures of sales by quarters for the period of years. The next step is to chart them; that is to say, to set them out in graphic form. Capacity to grasp figures varies, but even the specially trained mind can only grasp so many at a time. Charts really have a use; they are not mere devices to impress the groundlings, like the large coloured bottles in chemists' windows! A proper chart is a photograph of a certain series of events, or a certain state of affairs, which can be taken in at a glance. Let us now, for our present purpose, take a hypothetical series of figures of quarterly sales over a period of fifteen years. As the figures are hypothetical, and we want as simple an illustration as possible, we will omit the operation of turning them into index figures, avoiding this by choosing figures in suitable round numbers and with a commencing figure of £100,000. For the same reason, we may assume no major change in the general price level during the fifteen years in question. We simply take assumed figures of quarterly sales in £1,000's over fifteen years, and chart them as they are. The result appears in Fig. 1.

We are still a long way from a detailed comprehension of the figures. There are ups and downs which seem to follow no guiding principle. Even, however, at this first stage, certain things appear, namely, first a general tendency for sales to increase over a period of years, secondly, a series of short, "wave," fluctuations, and thirdly a series of longer, so to speak, "tidal," fluctuations. This brings us right to the heart of the matter. The curve of sales of any business will tend to show the following four types of variation, namely—

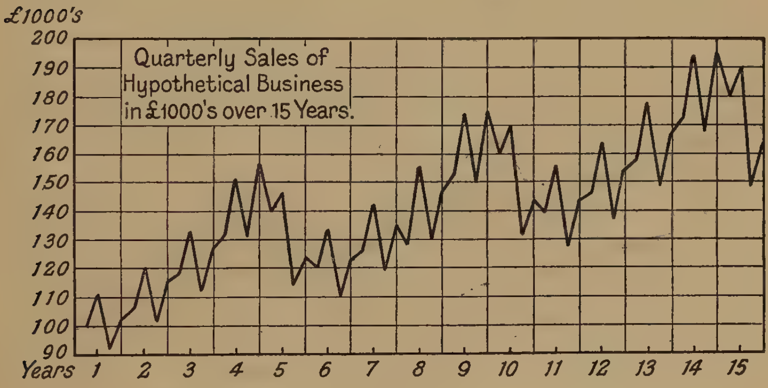


FIG. 1

1. The *secular*, or long-time, trend representing the gradual growth or decline of the particular business.

2. *Seasonal*, or similar periodical variations, characteristic of the industry.

3. *Cyclical* variations, reflecting the wider tides of business in general, and

4. *Special*, accidental, and other erratic variations, due to special events such as war, industrial stoppages, earthquakes, and other natural events, and so on.

The first step in forecasting the sales of an individual business is to endeavour to disentangle these various movements. If we can do so, we shall have materially advanced our chances of successfully forecasting future sales. Of course this information by itself will be insufficient; it will have to be combined with an estimate of the attractiveness of our product, in character, quality and price, in relation to those of competitors, depending in turn upon our relative efficiency in design, production, marketing, and advertising.

The secular trend is the long-period tendency, as distinct from short-time fluctuations. If we look at Fig. 1, we shall see that while there have been years which have shown sales less than those of the previous year, yet on the whole the business has been steadily increasing; every five years has shown a higher level. This secular trend is a compound of two things, the growth or decline of the industry as a whole, and the growth or decline of the particular business. If the industry is declining, the business showing average efficiency will decline with it; and if the industry is growing the business will grow with it. The business of higher efficiency than the average may grow more rapidly than the industry, or continue to advance even in a declining industry. It is obviously of prime importance, therefore, to arrive at a considered judgment on the secular trend of sales in the industry and in our own particular business; and to do so on a basis of fact rather than of opinion. A dependable conclusion on this question will help in two ways. In the first place it will throw light on what we have called the "far horizon"; for example, on the wisdom of expensive permanent additions to productive capacity. In the second place, it will help us to separate the long-period from the short-period variations.

Taking our particular figures, we can arrive at some conclusion on the secular trend in various ways. The simplest is to draw such a line freehand on Fig. 1, as appears to the eye to correspond most closely to the long-period trend. In our case this will (in fact) be simply a straight line ; and by measuring it off we can see that, over the period, sales have tended to grow each year at the rate of 4 per cent on the first figure of £100,000. These figures are, however, deliberately selected for the sake of simplicity. In real life, matters are seldom so simple. The line of trend may be a gradually rising or gradually falling curve ; or a curve of rise followed by a curve of fall, or a horizontal line, or any combination of these.

The same result can be achieved arithmetically by calculating a " sliding average " over a period sufficiently long to eliminate short-period effects. Thus, in the case of the figures we are now considering, if we calculate a five-year sliding average, an examination of the figures shows that, on the average, sales have risen as stated. This straight line of secular trend is shown later in Fig. 2.

These are somewhat crude methods of treatment. More refined statistical methods are available, and may have to be employed, but for simple cases and for broad conclusions, these will do ; and in any event they serve our present purpose.

We have now advanced a stage. Our very accommodating figures show a steady secular trend upwards of 1 per cent per quarter on the first quarter given. We can therefore reduce our index figure for the second quarter by one, for the third quarter by two, and so on, and thus eliminate secular trend.

The next thing is to see whether there is any, and if so what, seasonal variation. With some products, of course, there will be no seasonal variation. With others there may be some change with the seasons, but one so ill defined or so variable as not to lend itself to statistical treatment. Many businesses, however, will show a very definite seasonal variation, and where this is so, we seek to discover and to isolate it : first, that we may study the seasonal variation itself, and secondly, that we may study the available figures after the effects of any seasonal variation have been removed.

As in the previous case, a number of methods are available, some of them calling for advanced statistical knowledge. Again, however, we will select methods which, while lacking in mathematical accuracy, will sufficiently serve our purpose. It is obvious that if we take a yearly average of monthly or quarterly sales, any true seasonal influence will be eliminated. We take, therefore, a yearly sliding average of our revised figures, on the same principles as in the case of the five-yearly average. If, then, we charted this yearly sliding average, against the original quarterly averages revised by the elimination of the secular trend, simple examination should show whether or not there appeared to be any definite and continuous seasonal variation ; and we could make an approximate estimate of this from the chart. If this were done, it would be easy to see that there was a definite seasonal rise in the second quarter, and fall in the third. More exact figures should be obtained, however. First, we calculate by how much each quarter (that is to say, the first quarter, second quarter, and so on) differs from the corresponding sliding average for that quarter. Next, we add together all the resulting available figures for the first quarter and divide by the number of first quarters ; and so on with the second, third, and fourth. In this way, we find that on the average, the second quarter exceeds the yearly average by about 10 per cent, while the third is about 10 per cent below. These *average* figures of seasonal variation should then be charted and compared with the charted figures of seasonal variation in each of the fifteen years, in order to test how far the average is really a true picture. Averages are always figures to be handled with considerable respect and diffidence. It is so easy for vital divergencies to cancel out and so be overlooked in the final result. If, for example, in one year the second quarter exceeded the yearly average by 20 per cent and in the next year was equal to it, the *average* variation would be 10 per cent; but we should obviously be led astray if we therefore assumed that the second quarter could be expected always to exceed the yearly average by 10 per cent! In our case, however, we know that the resulting averages satisfy the test. We have, therefore, in the result, figures showing a pretty definite seasonal variation. This seasonal variation is shown later, in Fig. 2.

These figures are very useful in themselves. When we come to make our estimate of sales for the coming year, we can assume that whatever figure we take for the year, the second quarter may be taken as about 10 per cent in excess of the average, and the third as about 10 per cent below it. Indeed, we can, in this case, go further and assume (other things being equal) that the second quarter will be about 10 per cent over the first. We therefore get light on our first question, the "near future." These figures, however, are equally useful in the third stage of our inquiry, namely in our attempt to discover whether in our business there is any definite cyclical movement corresponding to changes in the prosperity of business as a whole. If now we eliminate seasonal influences the remaining figures will represent only—

1. These cyclical changes.

2. Special, or non-recurring events in business in general, or the world in general.

3. Changes peculiar to our own business, such as the introduction of new management, the adoption of new policies, special misfortunes, new lines, and so on.

The last (those under 3) must be allowed for to such an extent as seems right to the individual business man, who alone knows the facts; this applies both to past figures and future estimates. The effects of those in heading (2) can be seen after the event, but in most cases, by their very nature, it is impossible to estimate their effect in advance. If at the time we are making our estimate there is some definite danger in view (such, for example, as a widespread industrial stoppage), which, if it materializes, will seriously prejudice our business, then we may think it wise to modify in some respects our programme until the matter is determined, and in any event provide for an immediate modification in it if our fears are realized; but we cannot lay down any theory of forecasting which will provide in advance for the effect of such events. We are dealing with intelligent foresight and not with prophecy. We are offering assistance to judgment and not a substitute for it. The special influences must therefore be dealt with according to the circumstances, and to the best of our judgment. For the purposes of our present discussion, we must leave them out of account.

To return, then, to our present task, we must eliminate the seasonal variations we have discovered, and must make any special adjustment of the figures for any particular period which seems advisable in respect of special events, whether affecting the business or the industry; and the remaining figures should show any definite cyclical variation which may be present. Putting it another way, if the secular (or long-period) trend and the seasonal variations are removed, and there are no special disturbing influences, the resulting figures should show evidence of any cyclical variation. The exact nature of this will be better brought out by charting the yearly sliding average (which as mentioned, must, in its nature, be free from seasonal variation) against a sliding average for a longer period of years. This "longer period" should correspond as closely as possible with the length of the "cycle" which we are seeking to isolate; and, therefore, in the nature of things, the best period must be discovered to some extent by experiment. If all "trade cycles" were of equal duration the matter would be simple, but they are not; and over any substantial period of years our figures will normally cover "cycles" of varying length. There are various more or less refined statistical methods available to assist in this desired segregation, but it would be going beyond our purpose to deal with them here, even if one were fitted to do so. For our illustration, a uniform length of "cycle" has been assumed; and by charting the yearly sliding average against the five-yearly, the form of the "cyclical movement" in our figures is disclosed, as shown in Fig. 2.

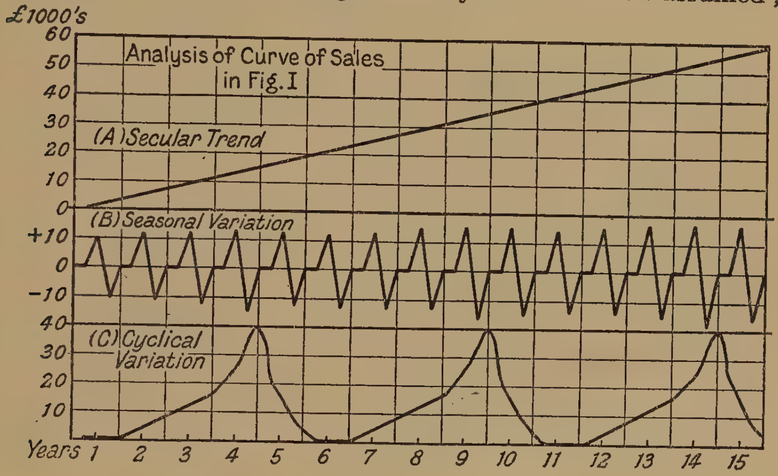


FIG. 2

In Fig. 2, then, are shown—

(*a*) the secular trend,

(*b*) the seasonal variation, and

(*c*) the cyclical variation.

Fig. 2 is therefore an analysis of the curve in Fig. 1; and the two should be carefully compared.

If, therefore, these were the actual figures of our business, our problem of forecasting would be largely solved. All we would have to do would be to determine the stage at which we stood in this five-year cycle, take the sales for the year just ending as 100, and then (1) add or subtract an appropriate percentage for the usual cyclical variation, (2) add the appropriate figure for the secular trend, and (3) adjust the quarterly figures for the usual seasonal variation. Subject to any special variations in respect of internal changes peculiar to our own business, or to such special general events as we have mentioned, the result would then be a perfectly dependable forecast of the sales for the coming year.

Unfortunately, things are not quite so simple in actual practice. We have deliberately chosen our figures so as to demonstrate most clearly the factors affecting our estimate; and we may hope that even on this basis the discussion may have been helpful. But, in practice, while there are these cyclical variations, they are neither so regular in time, in extent, nor in duration, as we have assumed. We cannot simply assume, therefore, in practice, that the cyclical movement will repeat itself in exactly the same way as on previous occasions. There is no "typical" cycle. We must go more deeply into the question, and endeavour to discover general principles, or devices, which will enable us to forecast as far as possible *probable* cyclical trends. If we are to some extent successful in this, we can then return to the present problem of forecasting our own particular sales for next year. We have already made this progress, at least: that we have seen that there *is* an important cyclical movement, which until we analysed the figures was not distinctly evident in our raw sales figures. In the succeeding chapters we shall discuss the theories of trade cycles and the extent to which they offer practical help to the solution of such problems as we have stated in this chapter.

CHAPTER III

THEORY OF FORECASTING

If economic history were simply a record of accidental and unconnected events, then obviously any so-called forecasting would be matter of the purest guesswork. " Picking a winner " would, by contrast, be a scientific essay ! The sceptic would be unanswerably right in his view that a boom or a slump cannot be predicted.

However, life is not a series of accidents, but of causes and consequences ; and this is as true of business as of any other aspect of life. When, with the development of industrialism, there came periods of intense trade depression, with resulting suffering and loss, economists began to give the subject exhaustive examination. As a result, they soon demonstrated that there was an up-and-down movement in business which followed a definite sequence or " cycle " of events, and which therefore we call a " cyclical " movement. The cycle is something like this. Business has been depressed and is just beginning to recover. Prices, which have for some time been falling, now begin to show stability. Over-heavy stocks are diminished. Money becomes cheaper. A feeling of confidence begins to take the place of previous pessimism. Orders begin to be placed in greater volume, production is increased, and some of those unemployed are absorbed into industry. Their wages serve to swell the volume of purchasing power, the industries supplying their needs are benefited in turn, and the process is accelerated. Production is further stimulated and profits and wages rise. The increased purchasing power circulates at a faster rate. Confidence grows into optimism. Advantage is taken of low costs not only to replenish stocks but to build new factories, and new means of transportation. This, in turn, stimulates other industries, including those supplying raw material; and the movement gathers momentum. Under the pressure of demand, prices tend to rise. At first this is checked by the reserve productive power which is available, but, as men become more convinced of the reality of good times, larger and larger orders are placed, credit is extended, and prices rise. Unemployment is reduced to a minimum, the sufferings of recent years are forgotten, and the pace quickens. Soon a boom is apparent, stocks are increased, prices rise more rapidly, profits rise, and caution becomes the exception. Then a crisis is reached, financial conditions become strained, money rates harden, and credit is restricted; possibly some spectacular bankruptcy takes place and a panic results. Whether this last be so or not, there occurs a slump. Orders are cancelled, goods are sold at a loss to provide liquid assets, and prices begin to fall. Falling prices stampede business men generally (and particularly speculators) into realizing while they can still do so without serious loss. Their selling accelerates the fall. Banks, which see their margin of security disappearing, and which are themselves in need of cash, call in their loans, or refuse to renew those expiring, which in turn forces still others to sell for what they can get. Buyers hold off. Production is at once contracted, unemployment rapidly increases, wages fall, profits fall or disappear, bankruptcies multiply and confidence goes. Economies are everywhere introduced and efficiency is increased. Slowly, after a period of realization and readjustment, the bottom is reached, and business steadies. The cycle is complete, and forthwith a new one begins, displaying the same major features.

We have described this cyclical movement in relation to business, but in fact it affects every part of human life. It appears, as we have said, in production, in prices, in profits, in bankruptcies and in unemployment; that is to be expected. But it appears also in such things as the marriage and the birth rate, fire claims on insurance companies, and convictions for drunkenness. For example, a rough analysis, made while writing this chapter, of the numbers attending a certain round of the English Cup football matches over a period of years, shows the same cyclical movement !

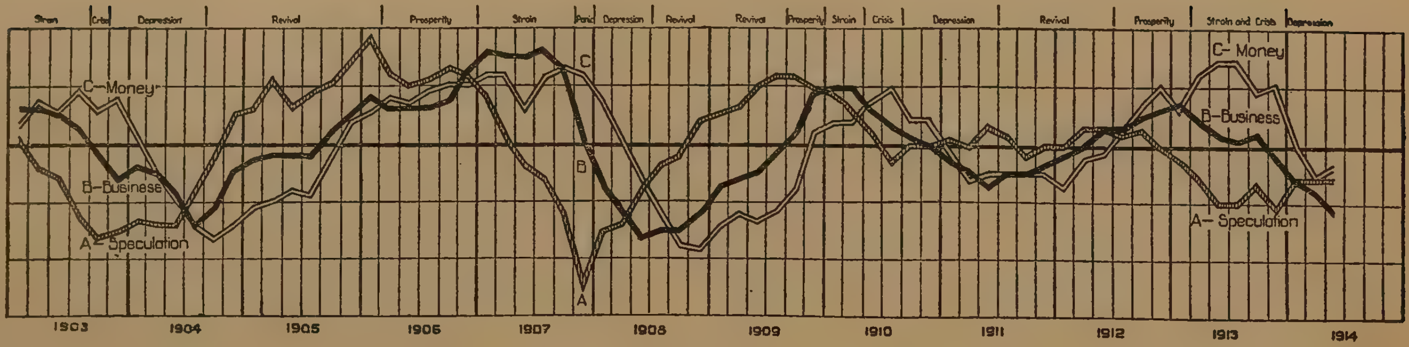
Nor need we necessarily assume that this cyclical movement is something quite new. Under modern industrial conditions it is far more pronounced than in simpler days. Nevertheless, some cyclical movement may have been apparent even in the early days of history. One wonders whether Joseph, when he "forecasted" to Pharaoh the seven fat years followed by the seven lean, had available in the ancient learning of the East some embryo theory of cyclical movement ! The Chinese word for "history" is "Bai waing," meaning "ups and downs." One wonders whether some recognition of ups and downs in economic as well as political affairs had not an influence on this choice of word ? Whether or not, however, cyclical movements occurred in the far past, we can certainly take them for granted in the present. The movement, indeed, is so evident and so universal to-day that it justifies Sir William Beveridge's telling phrase "the pulse of the nation."

The recognition of this definite cyclical movement was obviously a long step along the road to trade forecasting. If, for example, it could be shown that this cycle was definite, not only in character but in *duration*, the problem would be solved. In such case, all that would be necessary would be to establish at what point we stood in the current cycle and we should know exactly what to expect in the coming year (in the way of general trade). Certain economists did, indeed, claim this regularity in duration. Jevons, one of the most distinguished British economists, claimed that the cause of our trade cycles was to be found in sunspots ! His theory was that sunspots occurred at regular intervals, that crops in consequence showed a corresponding variation, and that this was reflected in the trade cycle. Unfortunately for this theory, however, subsequent research showed that trade cycles were not regular in duration, that they bore no fixed relation to sunspots, and that crop failures certainly could not be regarded as the sole cause of cyclical variation.

Following this recognition, efforts were next concentrated on finding the cause, or causes, of the cycle. Such discovery would not only enable the future to be foreseen with some accuracy, but might go much further and enable the fluctuations themselves, with all their social and economic waste, to be eliminated, or at any rate, largely diminished. Much work has been done along these lines, but the results have been disappointing. Almost innumerable theories have been advanced. An American committee appointed by Congress had some 150 separate theories put before it for its consideration. Later, a painstaking German economist tabulated 228 possible theories! The seriousness of the post-war depression has caused redoubled efforts to find a solution, and valuable light has been thrown upon the whole matter, and particularly on the part played by currency policy; but even yet it is impossible to say that any completely satisfying explanation has been advanced. It would be out of place to discuss the matter in any detail here. One can perhaps best summarize the position by saying that it would appear that cyclical variations are caused, or contributed to, by a number of interrelated factors. In the first place, crop variation is obviously one factor; but of minor importance to-day—at any rate in highly industrialized countries. Again, the mere distance in time and place between original production and ultimate consumption, must result from time to time in serious miscalculation of demand, with consequent maladjustment of supply. Further, the crowd psychology in business, resulting from our highly-developed news and intelligence services, must tend to exaggerate the influence of good or bad factors in the business outlook, with consequent swings of opinion from optimism to pessimism, and vice versa. The extreme maldistribution of wealth must bring an element of instability into the situation. Most important of all, however, and perhaps decisive, are financial considerations; that is to say, those policies and those factors which determine variations in the general level of prices. Here we must leave the matter. So much, indeed, would not have been said, but for the fact that even yet the critical importance and far-reaching influence of this cyclical movement of business does not seem to be recognized at all generally even by leading business men and politicians. Debate after debate on unemployment takes place in Parliament without even a passing reference to one of the most fundamental questions, namely, the true causes of the trade cycle. The present unemployment is frequently discussed as if it were an unprecedented and isolated event, whereas anyone with the necessary acquaintance with economic history can recognize that the depression of recent years is, in large measure at any rate, only a particularly severe example of the cyclical movement, which can be traced back for over a century. This, however, is a digression.

Having, then, failed to find any fully satisfactory explanation of the cause or causes of the trade cycle, a new line of attack was developed a few years ago by certain economists, and particularly those Americans whose names are so honourably associated with Harvard University. In brief they said, "*Let us take the trade cycle for granted, and endeavour to discover some signs which will indicate in advance the coming of the next phase of the cycle.*" After a great deal of statistical research, they arrived at certain very interesting results. Briefly, these were that, while all business indices move in cyclical fashion (that is to say, rise and fall in definite sequence), some indices apparently (for certain causal reasons) *always rise and fall before others*. In particular, if suitable indices are constructed to represent (1) Speculation, (2) Business, and (3) Money, the first will tend to change before the second, the second before the third, and the third, in turn (in the next cycle) before the first; and so on. If this is really so, its importance is apparent. The business man has only to watch the movements of a

HARVARD INDEX OF BUSINESS CONDITIONS IN THE U.S.A., 1903–14



Curve A—Speculation

New York City bank clearings, prices of securities, averaged.

Curve B—Business

Wholesale commodity prices, bank clearings outside of New York City, pig-iron production averaged.

Curve C—Money

Interest rates on commercial paper, loans and deposits of New York City banks, averaged.

Fig. 3

(*Reproduced by permission of the Harvard Committee on Economic Research*) suitable " speculative index " in order to receive due warning of a coming change in general business ; and to lay his plans accordingly.

After a great deal of experiment, the Harvard Committee on Economic Research ultimately selected, therefore, three main indices, representing—

A—*Speculation* : based on the prices of industrial stocks, railroad stocks, and railroad bonds, and on Town Clearings at New York banks.

B—*Business* : based on commodity prices, pig-iron production and Country Clearings.

C—*Money* : based on rates on four to six months' bills and on 60 to 90 days' commercial paper, and Loans and Deposits at New York Clearing banks.

The figures of general business conditions for the U.S.A. for the years 1903–14, are shown in Fig. 3. It is claimed that in every case a rise or fall in business has been preceded, *broadly speaking*, by a rise or fall in speculation ; and similarly a rise or fall in money by a rise or fall in business, *major changes* in A occurring some four to six months before B, and in B, roughly six months before C. Considerable weight is attached to the words " broadly speaking " and to " major " changes. If the reader will run his pencil rapidly along curve A he will realize that, broadly speaking, it does forecast changes in B. If he will do the same thing more slowly, or, better still, if he will cover up part of the chart with a sheet of paper and then, moving this in stages to the right, he will himself attempt at each stage to forecast the immediate future of curve B, he will soon find that there are short period movements in A which are not followed by corresponding movements in B ; and, further, that changes donot always occur within the four to six months mentioned. The same test can be made with the other curves. This is only mentioned here ; its significance will be discussed in the next chapter. Meantime, it does lead to this further discovery made by Harvard, namely, that the movements of the speculation and money curves *are specially significant when in opposite directions.* If reference is again made to Fig. 3, it will be seen that whenever curve A has crossed curve C, a major change has occurred in B; though here again the time of change has varied very considerably, sometimes occurring almost simultaneously and sometimes seven or more months later.

In Fig. 4 are shown indices on somewhat similar lines, prepared by Harvard, in reference to British conditions in 1903–14. Here, again, the position is broadly the same. There is clearly no automatic relationship which can be used as an infallible guide. Nevertheless, one can recognize in each case that the minimum and maximum points in A are always reached before the corresponding points in B, and so on; and that *major* changes are broadly indicated.

This theory, or method, of forecasting business, associated primarily with Harvard (and largely employed also by the London-Cambridge Service, to which reference will be made in a moment), is not only the best-known, but is also the one backed by the greatest weight of economic and statistical authority. There are, however, a number of others, differing in greater or less degree, two at least of which should be mentioned. These are the Babson Statistical Organization and the Brookmire Economic Service. Both of these organizations necessarily share a good deal of common ground with Harvard. They draw largely on the same statistical raw material; they, to a considerable extent, make use of the same statistical methods; and they arrive at their conclusions in the light of the same broad economic and statistical considerations. They each, however, have distinctive features.

Instead of circulating to its subscribers a composite chart on the lines of Harvard (uncovering, so to speak, all the machinery), the Brookmire Service offers one composite forecasting curve. On the other hand, instead of a single "barometer" it offers separate ones for forecasting stock

HARVARD INDEX OF BRITISH ECONOMIC CONDITIONS, 1903–14

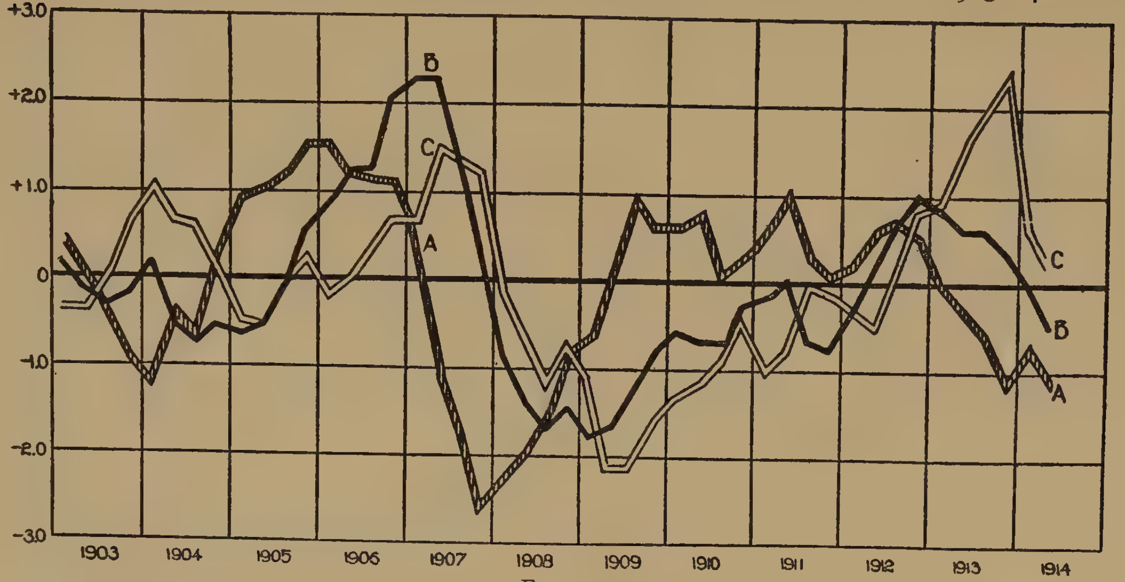


FIG. 4

The three representative series are—

(A) *Stock prices.* Market values of securities (*Bankers' Magazine* total less fixed-interest securities).
(B) *Wholesale prices.* Sauerbeck-Statist price index for "all materials."
(C) *Interest rates.* Market values of 7 local government bonds (signs reversed in order to show long-time interest rates).

(Reproduced by permission of the Harvard Committee on Economic Research)

prices, commodity prices, business, and so on. The investor, therefore, is guided in advance as to the movement of stocks, while the business man has the double guide of the forecasting index of Stocks and the similar subsequent movement of the index of Business. Not only is the barometer simplified in this way, but it is claimed that *any* change up or down can confidently be expected to be followed by corresponding movements in the other indices. In other words, there is no need to consider whether a given movement is merely a minor fluctuation which will not be reflected in subsequent business. Another feature should be mentioned. It is that, so far as ever possible, the indices upon which the barometer is based are so chosen as to eliminate the influence of changes in price level. The last is, in the writer's opinion, a very important point, as will appear later. A typical Brookmire chart is illustrated (by permission of the Brookmire Economic Service) in Fig. 5. It is claimed that these are the only forecasting charts "which forecast the definite month when conditions will change—stocks, bonds, commodities, and business—which require no study to be read accurately, and cannot be influenced by the personal opinion of the reader." It is claimed that a subscriber with $10,000 in 1907, investing it in strict accordance with Brookmire advice, would by June, 1922, have had $108,000. "His capital would have increased at the rate of 28 per cent compounded annually."

The distinctive feature of the Babson Service is that it is claimed to be based on the theory "that action and reaction are equal." Somewhat similar statistics to those used by Harvard are combined into one composite index, which is charted. Then a calculation is made to discover the secular or long-period trend of the nation's business. This, in turn, is charted, and is called the X–Y line. The first curve necessarily fluctuates above and below this X–Y line. The area above the line (representing expansion of business) is measured; and it is then predicted that it will be followed by a period of

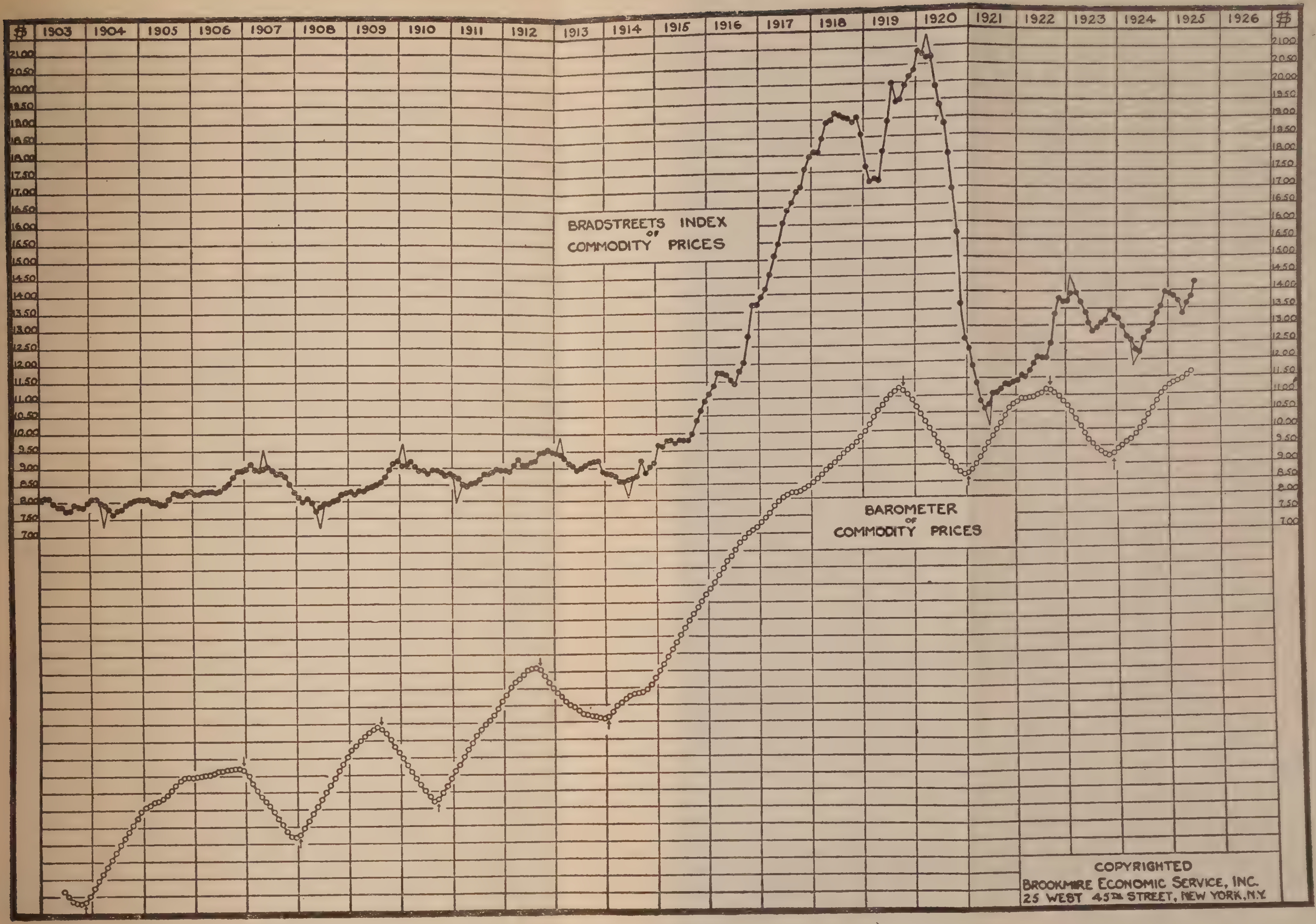


FIG. 5

BROOKMIRE BAROMETER OF COMMODITY PRICES

The arrows on the Barometer indicate the month of change from a favourable to an unfavourable position and vice versa.

The bases of the triangles on Bradstreet's Index of Commodity Prices include the fourth, fifth and sixth month after the month of change in the Barometer.

(Reproduced by permission of the Brookmire Economic Service Incorporated, and of Mr. Ray Vance, its President)

business contraction of equal area. It is claimed that in consequence the ordinary reader can see at a glance just where we stand at the moment, and, if it is a period of depression, how long this period can be expected to continue. The theory is best grasped by reference to the Babson chart, illustrated by permission of the Babson Statistical Organization, in Fig. 6. Two alternative charts are offered to subscribers, one with price inflation or deflation eliminated, and one with these price changes retained. In each case the main Business Volume Index is supplemented by indices representing speculative stocks, bonds, and commodity prices.

It would be a fascinating pursuit, if time and space permitted, to make a careful examination of these three main forecasting services, and the results achieved by them over a period, and so arrive at a considered conclusion as to which is best ; or as to whether a fourth could be evolved combining the stronger features and avoiding the weaker features of all. Time, however, does not permit ; and in any event, it would take us quite beyond our present purpose. We are discussing the general theory of trade forecasting, and of trade cycles in particular, and in spite of fairly obvious dissimilarities, each of these three services is based on the same broad principles. For our present purposes, therefore, we must base our subsequent discussion on only one of the three, and this clearly points to the Harvard Service. In the first place, as has been said, it is backed by the greatest weight of economic and statistical authority. Secondly, by its very "nakedness" it lends itself best to our purpose. The whole of the machinery of forecasting being laid bare by the Harvard Committee of Economic Research (a name in itself significant to our purpose), we can test not only how far it has proved right or wrong in practice, but where and to what extent. Thirdly, the only comparable service available relating to British conditions is the London-Cambridge Service, which follows along lines similar to Harvard. American readers who may contemplate subscription to an American forecasting service will be able to obtain full particulars of the three services mentioned, and others available in the U.S.A., and to make their own selection. Our subsequent discussion, then (without in any sense reflecting on the value of these other services), will be based on the theories associated primarily with Harvard.

We can perhaps summarize the contents of this chapter as follows—

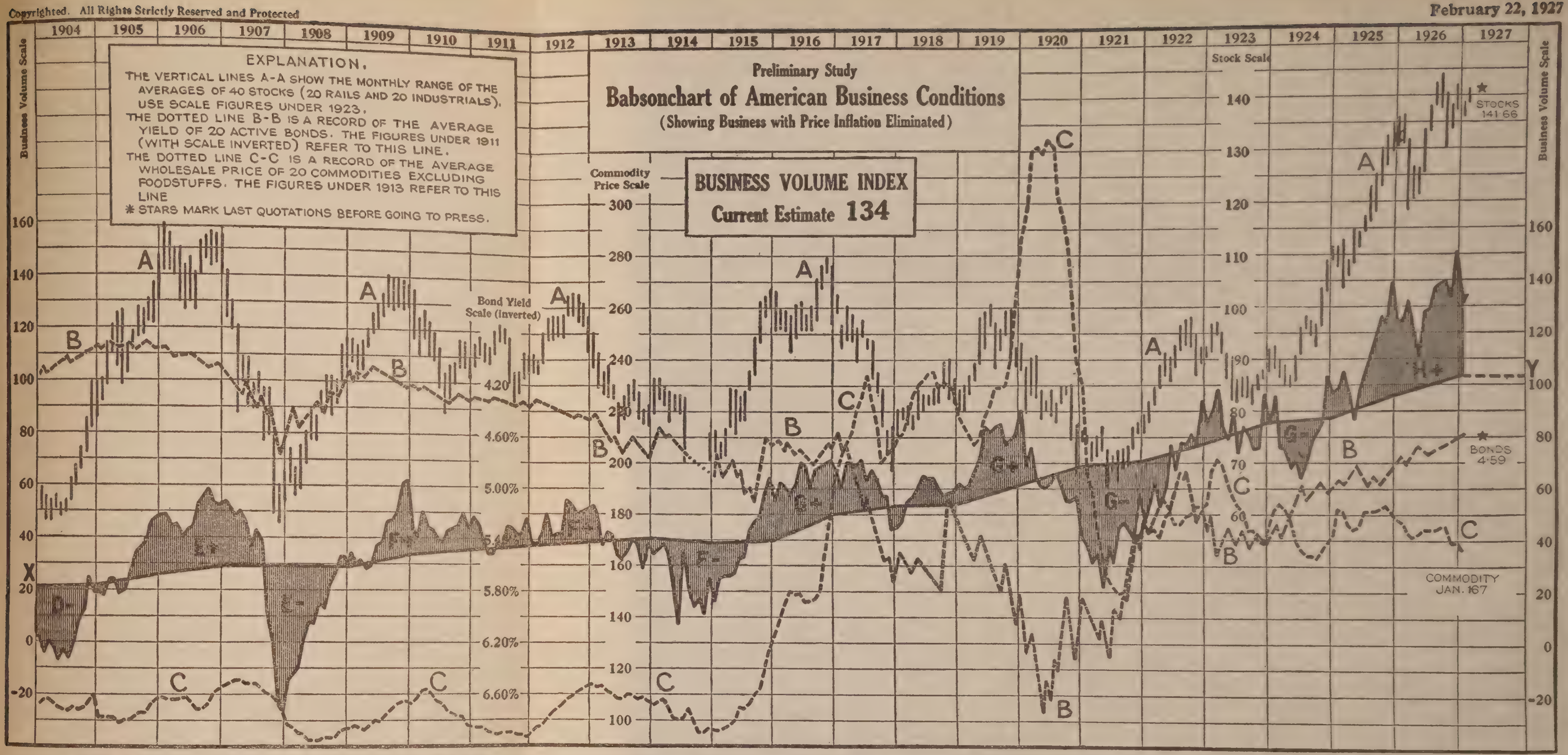
1. The general course of business, with its phases of prosperity and depression, does not constitute a series of merely haphazard events. On the contrary, there is a definite cycle or sequence of events, a rhythmic movement, an ebb and flow.

2. The cycle is not regular, either in duration or extent, and its future cannot therefore be accurately forecasted by reference only to past cycles.

3. The causes of the cyclical movement have not yet been sufficiently elucidated to offer definite guidance on its probable future course at any given time.

4. However, it is claimed that while indices of business activity show similar tide-like movements, some (in their major movements) invariably precede the main volume of business, while others invariably follow it. In particular, when a suitable index of speculation, after falling for some time, begins to turn upward while money rates are falling, then a major revival in business will occur, probably from six to twelve months later. When the reverse position occurs, a decline in business activity will occur after a similar period.

In the following chapter we will endeavour to test how far these claims have been borne out in practice.



EXPLANATION OF THE DEFLATED BABSONCHART

.This study of the Babsonchart, deflated, is based as far as possible on the same subjects which make up the Babsonchart of Business Value. These subjects, treated to eliminate price inflation where depending on dollar values, are as follows: Check Transactions, Failures, Pig Iron Production, New Building, Domestic and Foreign Money Rates, Volume of Foreign Trade, Railroad Earnings and Crops. Stocks (Rails and Industrials), and an Index of Canadian Business Conditions are also included.

The purpose is to represent the volume of transactions, irrespective of any change in the general price level thruout the period, i.e., the volume of business expressed in physical units. Because of the difference in retail and wholesale price movements since 1913, we have used since that date a weighted price index in which both wholesale and retail price changes have been considered.

Business Failures and the Volume of Foreign Trade, expressed in dollars, are corrected by Bradstreet's Index of Wholesale Prices thru 1913 and by our weighted price index since that date. The proportion of price movement which will be reflected in Bank Clearings (or Check Transactions) has been estimated at 75%. Check Transactions (Bank Clearings before 1919) in this plot are therefore corrected by the weighted index adjusted to show three-quarters of the actual price movement. New Building, expressed as value of permits, has been corrected by the average of Babson's Building Materials Indices. Railroad Earnings are deflated to correspond with changes in railroad rates.

The same scale tables are used for the various subjects as in the Babsonchart of Business Value. The X-Y Line is located in the same way as in that Babsonchart, except that it is corrected to eliminate the effect of price changes.

The line X-Y represents the country's net gain or growth. Based on the economic theory that "action and reaction are equal" when the two factors of time and intensity are multiplied to form an area, the sums of the areas above and below said line X-Y must, over sufficiently long periods of time, be equal, provided enough subjects are included and properly weighted and combined.

The high points of the stock market have come in the early part of the overexpansion areas. The low points have come in the early part of the depression areas, although in 1914 the war held prices of both stocks and bonds down longer than usual. The Babsonchart is an excellent guide for purchasing, because we can know the approximate size of the depression area. Not knowing in advance the size to which the overexpansion area will develop, one must use judgment as to when to sell. Low money rates and high bond prices have usually come about the end of the depression areas and high money rates and low bond prices at about the end of the overexpansion areas.

FIG. 6.

Reproduced by permission of the Babson Statistical Organization (certain slight modifications being made to allow of presentation in one colour

CHAPTER IV

FORECASTING TESTED IN PRACTICE

Is the theory of trade forecasting summarized in the previous chapter one upon which the business man or manufacturer can act in practice? This question can best be answered by considering how far an application of the theories which we have just described would have enabled us to forecast past changes in business. In this inquiry, separate consideration must be given to pre-war and post-war conditions, for reasons which will presently appear.

Let us refer once more to Fig. 3, showing the trend of American conditions from 1903–14. Place a sheet of paper over Fig. 3, and then slide it in stages to the right, attempting at each stage to forecast the trend of curve B in the light of the previous movements of A and C. During 1903, A is falling steeply, and B follows suit. From September, 1903, however, A begins to show a slight rise, while, simultaneously, C, broadly, is falling, and, if our theory were infallible, B would begin to show a rise early in 1904. On the contrary, in February, after a slight improvement, it develops a further steep fall, continuing until July. At this point, curve A has not only begun a steep rise, but has crossed curve C, which for some months has shown a steep fall. We expect this crossing to indicate a major change in business in an upward direction. This major change takes place, continuing right up to the middle of 1907. It begins, however, not four to six months after June, 1904, but one month after. At May, 1905, curve A has been falling steeply for two months, and curve C rising, and we have to ask ourselves whether this indicates that a period of depression is about to develop. However, next month, curve A turns upward again and business follows suit. Again, in May, 1906, curve A has been dropping steeply for four months, with C rising and at a high level, and with more confidence we might expect that the cycle had reached its height and business was about to fall off. Business, however, after losing a little ground (simultaneously with curve A) continues its upward direction. In the autumn of 1906, curve A again begins to turn down. Up to December, the fall is gentle, but it is given significance by the fact that at this point it crosses curve C, which is still rising. Finance is becoming strained. We therefore anticipate a major change downwards. This occurs, but not until seven months later. Readers can continue the same tests for themselves up to 1914, with similar results.

A corresponding test of the curves relating to British conditions in the same period (see Fig. 4) will yield similar results. The major improvement, which began in mid-1905, is forecasted by the rise in the Speculative curve A, beginning in early 1904 and crossing the Money curve in late 1904. Similarly, the slump of mid-1907 is clearly forecasted in January, 1907 ; the recovery in 1909 by the crossing of curves A and C in December, 1908 ; and the falling-off in 1913 by the intersection of the autumn of 1912. On the other hand, there are various minor movements which might have misled the business man at the time if he had relied solely on the barometer. For instance, while the Speculative curve was falling steeply and continuously up to February, 1904, quite a little peak in Business developed during the same period. While the falling-off in the Speculative curve began in February, 1906, Business continued to grow rapidly up to the spring of 1907, nearly fifteen months later. The steep fall in the Speculative index in mid-1910, was followed by a substantial rise in Business ; while the similar fall in 1911 was accompanied, and not followed, by a fall in Business. In parentheses, it may be mentioned that the considerable fluctuations of 1910–12 were largely the result of industrial unrest, a fact which in itself points to the impossibility of any merely automatic forecasting of business.

We may sum up at this stage by saying that consideration of pre-war conditions suggests that even under normal conditions no index yet devised can be relied upon as an *automatic* indication of the trend of business. The barometer must be interpreted in the light of a knowledge of general economic and business conditions, and with due allowance for disturbing factors. Nevertheless, under such so-called normal conditions, such a barometer would have formed a valuable indication of *major* changes in business.

What of the disturbed post-war conditions ? Let us apply similar tests. Fig. 7 shows the Harvard chart of U.S. post-war conditions. The statistical basis is not identical with the pre-war chart, but is near enough for our present purpose. Here, again, the results are very similar to those of pre-war days. The crossing of the curves of Speculation and Money in the spring of 1919 foretells the boom of 1919-20 ; a similar crossing a year later, Speculation this time being in a downward direction, foretells the slump of 1920-21 ; while a similar crossing in early 1922 foretells the succeeding upward swing of 1922-23. Other movements, however, are less in accordance with theory.

In the first place, the same minor divergencies occur as in the pre-war figures. Thus, in the first half of 1919, Speculation does not precede the rise in Business but accompanies it. Again, in the autumn of 1922, a steep drop in the Speculation curve, taken in conjunction with the rising Money curve, might, if taken alone, have been regarded as a warning of another slump, while this view was falsified in the succeeding months.

These instances, however, are similar to pre-war ones, and only go to reinforce the view that such a barometer taken alone cannot be regarded as an automatic guide to short-time fluctuations.

There are, however, more important and more unorthodox departures from the expected. In the middle of 1923, the Speculative index had been falling and the Money index rising

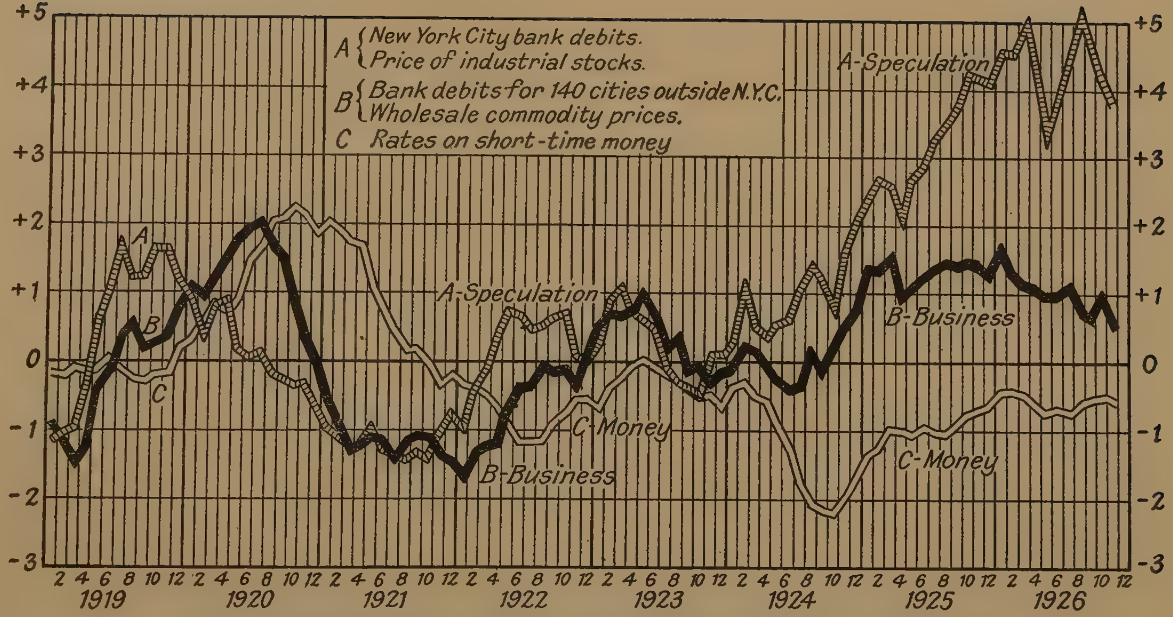


FIG. 7. HARVARD MONTHLY INDEX CHART OF POST-WAR U.S. CONDITIONS

Reproduced by permission of Harvard Committee of Economic Research. (The year 1919 is added from an earlier chart.)

quite steeply for some time. It looked as though these movements of the two curves would continue and their intersection herald an ordinary slump in business. Matters, however, did not follow a usual course. In the first place, the reaction in business did not wait for the usual lag of four to six months, but occurred practically simultaneously with the fall in the Speculative index. Secondly, at the last moment, just as they touched and were about to cross one another, the Speculative and Money curves appeared to change their minds! After running together for a quarter, the Speculative curve turned sharply upwards, and by February, 1924, had reached a point equal to that of a year before. Thence, with minor recessions, it continued a remarkable climb, reaching an unprecedented height in 1926. Meanwhile, the Money curve, after hesitating a little, turned swiftly downwards, reaching a low record in October, 1924, from which it then gradually rose.

The Business curve, naturally perplexed by these movements, ceased its downward fall in the last quarter of 1923, and, after more or less maintaining its position for nine months, began quite a steep upward movement in the last quarter of 1924, and maintained its high level right into 1926.

Instead, therefore, of a slump in 1923, we had a minor recession in business followed by a Stock Exchange boom of unexampled dimensions, and very active business. How can these changes be reconciled with forecasting theory and what is the explanation ?

It would be more fitting for a statistical expert, and preferably an American expert, to answer these questions ; but some answer here is necessary to our present purpose. In the writer's opinion, the explanation is threefold. In the first place, the Harvard Index of Business, by its nature, is not an altogether satisfactory indicator of the *quantity* of business ; and of production, in particular. Secondly, certain special events occurred to give a fillip to American business, including, in 1924, a record harvest in the United States and a poor harvest elsewhere, the adoption of the Dawes Report, and the Coolidge election. Thirdly, and most important of all, although the United States has been continuously on the gold standard, something resembling inflation in its effects has taken place there in recent years (as part of the after-effects of war). Gold for a long time poured into the country in ever-increasing quantities, and, in spite of the restrictive efforts of the financial authorities, tended to swell materially the quantity of purchasing power. Simultaneously, there was a rapid and unexampled development of selling by instalments a large number of products which previously had been mainly sold for cash. This great extension of credit had a similar inflationary effect. The two things together acted as a stimulant; and, first, checked the tendency towards depression, and then, as the "inflation" continued, began to build up conditions tending towards boom. That a true boom did not, in turn, develop in business, on the lines usually associated with an inflation period, was due, again, to two factors. In the first place, the Federal Reserve Banks appear to have used their influence and efforts to check the repetition of the events of 1920. In the second place, business men still had vividly in mind the disastrous effects of that boom and its succeeding slump, and had furthermore been studying more closely the fundamental economics of trade fluctuations, and in consequence seconded the efforts of the banking authorities by pursuing a fairly cautious and prudent policy (whilst simultaneously seeking to reduce production costs by increased efficiency). This, on the one hand, for example, accounts for the closeness with which the Business index, in mid-1923, followed the movements of the other indicators downwards, and then refused later to follow the Speculative index too far upwards in its wilder flight. On the other hand, this large purchasing power was bound to find its outlet somewhere and, denied it in business, showed itself in the Stock Exchange boom; it explains, therefore, the rise in the Speculative index.

This, at any rate, is the writer's own explanation. If it be correct, the unusual movements in the later post-war United States indices are attributable to abnormal conditions, and the normal forecasting theories are not thereby discredited.

We turn now to post-war British conditions. In Fig. 8 is shown the London-Cambridge Index Chart of the United Kingdom from 1919 to date. It will be noted that here, in place of the three curves representing Speculation, Business, and Money, we have four. The first and fourth, namely, the Industrial Stock index and the Short Money index, may be treated as equivalent to the first and third in the previous Harvard charts; while the second and third, namely, Prices and Exported Manufactures, are selected by the Service as being the best available indication of British "Business"; that is to say, they may be regarded together as equivalent to the single Business curve in previous charts. Whether, in fact, they do constitute a suitable indicator of British business, is a matter we shall discuss in a moment. Again, in place of the "measure of deviation" used on the American charts, the London-Cambridge figures are indices representing percentages of the 1913 average. However, in principle the chart is similar.

Up to a point these curves follow the course which we would anticipate. They rise and fall, and Speculation precedes Business and Business precedes Money. Thus, the Speculative index rises up to January, 1920, and the Price and Exports indices up to May and June of 1920. The Speculative curve falls from January, 1920, to October, 1921, while the two Business indicators fall steeply from mid-1920 to mid-1921, in the case of Exports, and early 1922 in the case of Prices. A striking feature, however, and one which will be very apparent to British readers, is that the next upward swing in the cycle, which should have been anticipated by about 1923 at any rate, has not even yet taken place; or, more precisely, does not clearly appear from the chart. The usual stage after a slump

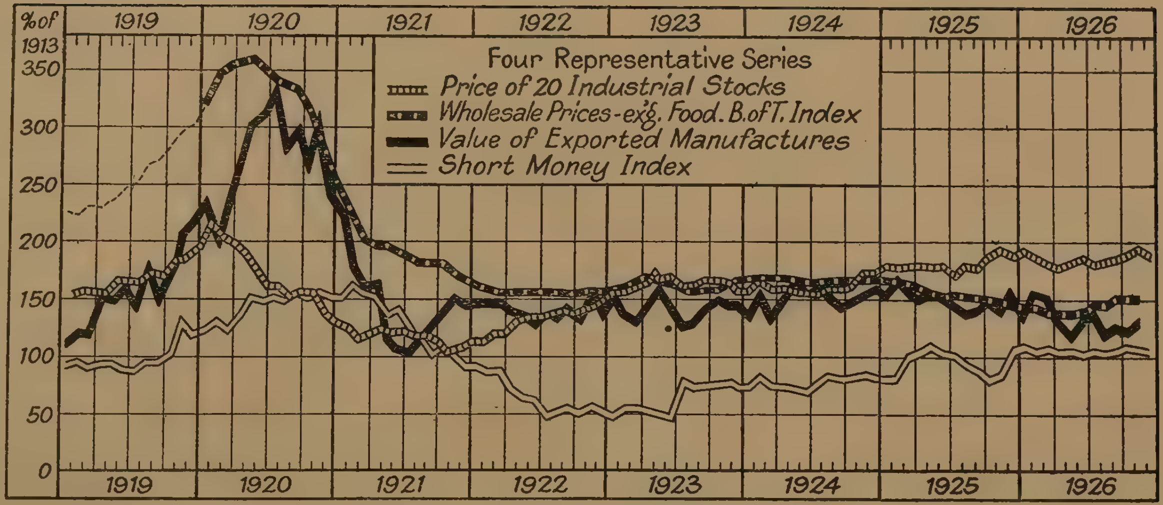


FIG. 8. LONDON–CAMBRIDGE INDEX CHART, U.K.

(*Reproduced by permission of the London and Cambridge Economic Service*) is a "bumping along the bottom." From the chart it would appear we have bumped along or near the bottom now for some four years or more! To explain, or to endeavour to explain fully why this is so, would take a book in itself. Readers who are interested will find no lack of material. In particular they will find much light in the Reports of the Balfour Committee on Trade and Industry. There are several major reasons, however, to which brief reference may be made. They can be classed under two heads, first, the facts, and secondly, the presentation of the facts.

Taking the latter first, it is well known that the volume of information available with regard to business in this country is only a fraction of that in the U.S.A. There, broadly speaking, the important facts are available. Here, we have only a sample here and a sample there, and even these samples are often not representative. For example, the only reasonably complete information available in Great Britain, with regard to the volume of production, relates to the coal-mining, the iron and steel, and the shipbuilding industries. These are industries which show extremes of fluctuation and cannot therefore be taken as representative of production in general. We see that to-day. Broadly speaking, business in the "sheltered" industries is quite good; they are indeed enjoying a considerable measure of prosperity. However, the export industries are suffering severely, and it is the export industries about which alone we have substantial information.

In these circumstances statisticians are compelled to take, as their measurements of business, indices which they realize are not very satisfactory even in normal times, and very unsatisfactory in our post-war world. Thus, the London-Cambridge Service takes, as we have mentioned, wholesale prices and the values of exported manufactures as its indicators of Business.

Now one of the outstanding features of the years since 1920 in Great Britain has been the rapid fall in money prices.

As we shall submit in a moment, the effect of this has been to impose a continuous actual check on business. However, quite apart from this, its effect is obviously to distort any figures *which are stated in terms of values.* Wholesale prices in the United Kingdom at the time of writing are about 50 per cent over pre-war. At the height of the boom they were more than 250 per cent over pre-war. At first sight, therefore, if we take prices as our indicator of business, the volume of business to-day appears to be insignificant in relation to 1920. Actually, however, the volume of production to-day may be much in excess of it. This price index is therefore misleading by its very nature. The same thing applies to *values* of exports. Though the values of exports to-day may be only a fraction ot those in 1920, their *volume* may in fact be greater, because they are being sold at a far lower price per unit. These values of exports are misleading also, as an indication of the total volume of business, for another reason, to which we have just referred, namely, that our export industries are suffering much more than industries in the aggregate. It follows that the volume of manufacture in the United Kingdom is much greater in fact than is indicated by figures relating to exports.

These indices of Business are therefore very unsatisfactory. Whether better ones can be found at the moment is another matter. The London-Cambridge Service has recently worked out an index of Production. If this were reasonably representative of the whole volume of production, it might be possible to substitute this in whole or in part for the two criticized indices. In fact, for some time, in spite of some of its rather obvious weaknesses, I so used this Production Index, weighted in terms of the level of prices from time to time; taking the price level for this purpose as a mean between the Board of Trade Wholesale General Index and the Ministry of Labour Cost of Living Figure. Fig. 9 shows the previous London-Cambridge Chart, with the weighted Production Index substituted for Prices and Exported Manufactures. Readers

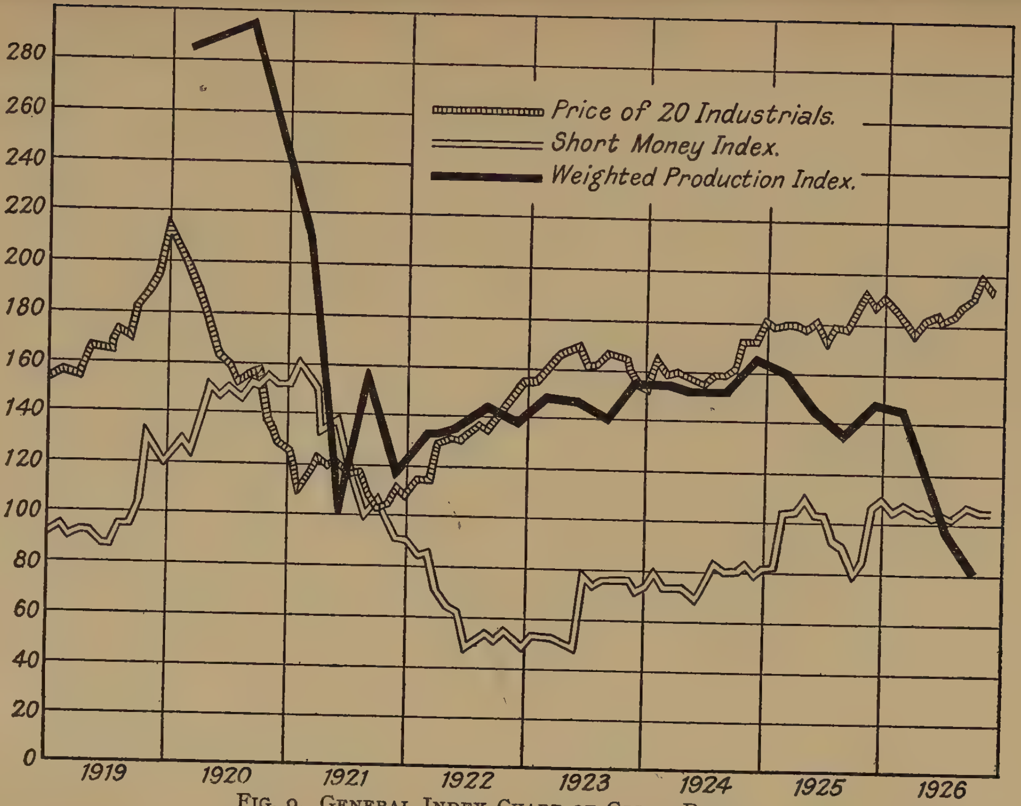


FIG. 9. GENERAL INDEX CHART OF GREAT BRITAIN

Showing the London-Cambridge Speculative and Money Indices, in relation to the London-Cambridge Production Index, weighted in terms of the mean between Wholesale Prices and Cost of Living can compare this with the London-Cambridge Chart in Fig. 8. It is less open to the criticism levelled against the Exported Manufactures index, namely, that it is not representative of British industry as a whole. Further, it is much less open to criticism on the ground of price change because it is founded on quantity production, and furthermore, the mean between Wholesale Prices and Cost of Living shows less fluctuation than Wholesale Prices alone. However, during the period of the coal stoppage in 1926, the Production index so greatly exaggerated the effects of the stoppage (falling in the third quarter of 1926 to less than 50 per cent of pre-war), that I have been compelled to drop it. Pending some Production index more representative of British industry as a whole, I have been constrained to rely largely, as a working index, on the percentage of employment in British industry, based from 1921 on the percentage of unemployment amongst the twelve million workers insured under the State Insurance Scheme, and for earlier years on the Trade Union percentage. From April, 1926, I have had to add each month an estimated figure in respect of insured workers (chiefly coal-miners), unemployed but disqualified from State benefit on the ground that they were parties to a trade dispute. Fig. 10 shows the same two London-Cambridge indices of Speculation and Money, and in addition this "volume of employment." In parentheses, readers should be reminded that this index can only properly be compared with the other two in respect of *direction* of movement, and not extent, because it has an altogether different base (namely, the percentage of those unemployed from year to year) and is shown on a different scale.

It probably, however, shows more clearly than any other immediately available curve, the true course of productive activity. It shows a high volume of employment in 1919 and 1920, but no very great rise during this period, thus supporting the view that the boom of 1920 was a *price* and not a production boom. It shows the swift slump of 1921 (exaggerated a little,

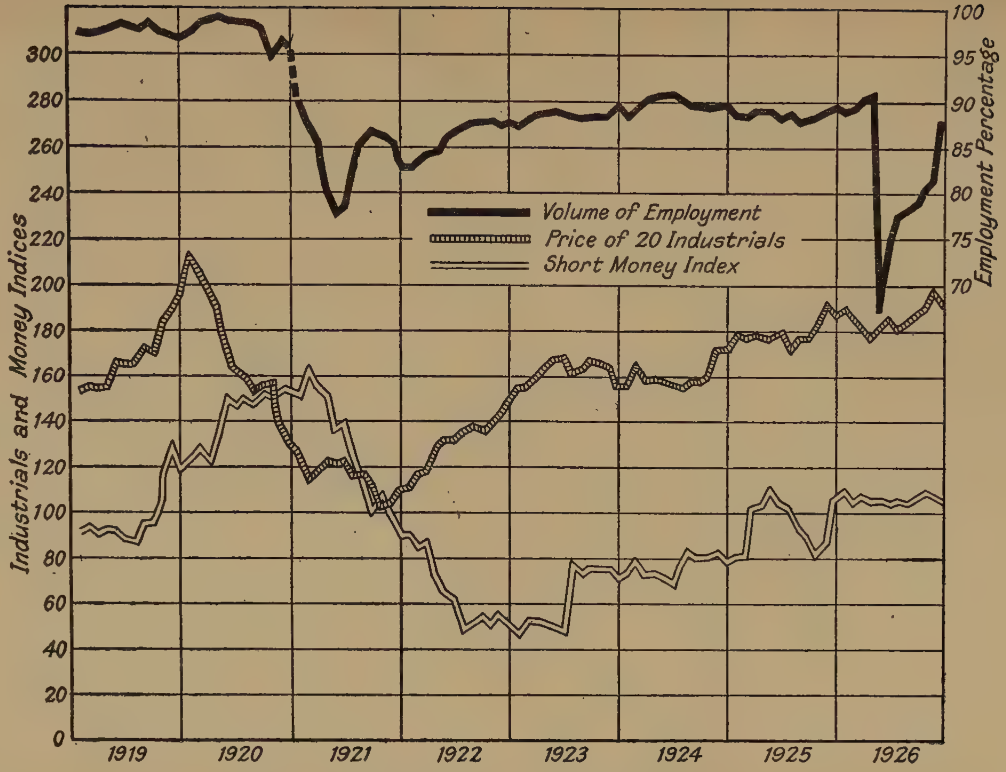


FIG. 10. GENERAL INDEX CHART, GREAT BRITAIN

Showing the London–Cambridge Speculative and Money Indices; and, in relation to them, an index based on the Trade Union percentage of unemployment up to end of 1920 and the State percentage beyond. The last is increased after April, 1926, by the estimated number of insured persons disqualified from State benefit under the trade dispute clause perhaps, by the change-over from the Trade Union to the State percentage of unemployment) and the momentary partial recovery and subsequent fall (representing, if you like, the bounce of the falling ball). It then shows the slow, steady recovery up to the summer of 1924 (the curve, however, in my view at any rate, being to some extent flattened by the effect of the country's deflation policy) and the falling away from the middle of 1924 under the shadow of the approaching return to gold and resulting appreciating exchange. Finally, it shows the steady recovery in the second half of 1925 and up to April, 1926, heralded by the rising Speculative index and falling Money index, and then the swift fall and slow recovery representing the effects of the General Strike and coal stoppage. While, therefore, it has many defects as a Production index, it is perhaps the best single index available. Others could be used either singly or in conjunction, such as Country and Provincial Bank Clearings, Poor Law Relief, and so on; but one hopes that at an early date, with the help of the Board of Trade, an altogether more effective *ad hoc* Production index may be devised and published.

This, however, is all a digression; we were discussing the objection to the two indices chosen to represent Business in the London-Cambridge Service. Returning to this, we can sum up by saying that the indices chosen (possibly unavoidably) to represent Business, necessarily *exaggerate the height of the boom in* 1920 *and minimize the extent of recovery up to the present time.* In such circumstances, we must not be surprised, therefore, if we experience difficulty in tracing sequences which were readily apparent under the more normal pre-war conditions.

So much for the presentation of the facts. The facts themselves, however, are also affected by these abnormal post-war conditions. It can scarcely now be a matter of controversy to suggest that the rapid fall in prices and other special features of the so-called "deflation" period, to which reference has been made (whether these have been wholly inevitable, or whether, as I think, they have been aggravated by a financial policy which has had too little regard for the well-being of industry) have constituted an immense handicap to British industry. This has been particularly so in view of certain conditions in other parts of the world, such as inflation and consequent depreciating exchanges, to which reference will be made in a moment.

The harmful results of deflation extend far beyond the deterrent effect on enterprise of falling prices. For example, falling prices result in the forcing down of nominal wages (even assuming no reduction in real wages), and this, in turn, causes an attitude of suspicion and antagonism in the mind of Labour. This leads to a lack of co-operation, and often to actual obstruction and ca' canny, which makes for inefficiency of production just at a time when increased efficiency is particularly needed. Further, rapid "deflation," by artificially restricting production, increases the unit overhead charge, and so sets up a counteracting tendency to the fall in prices which is sought. Deflation, again, increases the burden of taxation by raising at each stage the dead-weight burden of internal debt in terms of things.

In my view, therefore, the normal rise in the curve of business to the prosperity level which one expects in a "typical" cycle has been limited and checked by financial policy. In other words, we have been trying to climb out of the trough of depression with the brakes on; and four-wheel brakes at that! While, therefore, in recent years the U.S.A. have enjoyed unusual prosperity, the U.K. has continued to experience depression; these things being accounted for to a material extent by abundant "money" in the U.S.A. and deflation in the U.K. Both countries reduced prices, the former by increasing production, the latter by restricting demand.

Simultaneously, other abnormal factors have been affecting the foreign trade on which we are so largely dependent in this country: to a far greater extent, indeed, than any other country in the world. One obvious abnormal factor is simply the converse of the deflation we have just discussed, namely, the inflation policies of some of our chief competitors. Just as the falling price level here has caused an appreciation in the £ sterling, and so made purchases by foreigners from this country proportionately more difficult, so inflation elsewhere has depreciated the mark and the franc and the lira, and so on, and made purchases from those countries proportionately more advantageous. Another important feature has been the growth in number and amount of the tariffs of foreign countries, designed in many cases to protect infant industries born while we were at death grips. These and other matters have imposed *abnormal* checks on British foreign trade, and consequently on British trade in general, which have further conspired to restrain that upward swing in the trade cycle which past experience would have led us to expect before now.

In view of the cumulative effect of all these things it is not difficult therefore to understand why the curves in these last three charts have not worked out "according to plan." What is not quite so obvious, but what is equally true, is that in consequence of these things we do not in fact now fully know where we stand in the trade cycle! What is Britain's post-war "normal" condition? Are we experiencing it at present? Are we to regard a million unemployed as a normal condition, the number only to be reduced at the very height of a boom? Are we, like America, high up in the prosperity phase now, or are we still in a long-drawn-out recovery stage of a non-typical cycle? We do not really know; nor shall we fully know (though we may have our opinions) until we have been back for an adequate period on a real gold standard basis.

One other important point should be made before drawing our various threads together. It is that the vastness of the losses suffered in the last slump, and the great attention which has since been centred on the cyclical movements in trade, and the development of forecasting agencies, have led business men to think ahead to an extent which has never before been the case. They burned their fingers very badly through ignoring the available advice of the economist, and, so long at any rate as the smart remains, they are on their guard against burning them again. At the first sign of what seems to be approaching boom, they begin to go more cautiously and restrict their commitments. Instead, therefore, of stimulating a boom development, they check it. The effect of this, while it lasts, must be to reduce the height of the peaks of trade prosperity and the depth of the depressions. This has been seen in the U.S.A. in recent years, where waves of trade have tended to be replaced by ripples. This development again, taking a long view, is all to the good. Its effect in diminishing human suffering is even more important than its diminution of economic waste. This result alone would justify all the work done in investigating and expounding the causes and effects of cyclical swings. Its immediate effect, however, is to make it proportionately more difficult to forecast the extent and duration of the ups and downs.

We must leave to a further chapter the application of all these considerations to the practical business problem of forecasting next year's business. In the meantime, it is submitted here that any failure of our trade barometer during recent abnormal years, while it may justly be regarded as evidence of its limitations, and of the care with which it should be utilized, should not be regarded as adequate evidence of any inherent defect in the underlying theory.

CHAPTER V

WHAT FORECASTING CAN CONTRIBUTE

We have considered in the previous chapter actual business fluctuations in comparison with what would have been indicated by the most generally accepted theory of business forecasting. We have now, in the light of this, to crystallize our views on the question of how far the business man, in making his plans for the future, can look for help in this direction. In so doing, we had better at the outset " forecast " a major line of criticism which may be present in the minds of readers, and which, if well sustained, would be fatal to forecasting theory.

The keen critic may aver that when all is said and done, all that the current theory of trade forecasting really does is to substitute for one's own judgment that of Stock Exchange speculators in general. He may claim, in other words, that while we have set out to devise a scientific method of forecasting trade, actually the " Speculative index " on which we primarily rely represents nothing more than the crowd psychology of the stock market.

It is obvious, on consideration, that there is at least some foundation for this criticism. It is common knowledge that there are often rapid changes in Stock Exchange values due to rumour, to unfounded panic, to excessive optimism, to an exaggerated belief in the effects of imperfectly apprehended facts, and so on. These things have no direct connection with the course of production and commerce, and to the extent that they affect the Speculative index on which we rely, to that extent they destroy its value as an indicator.

However, this is only part of the truth. While to a certain extent variations in Stock Exchange values are due to such factors as these, it is obvious that they cannot fully account for the variations. They may account for temporary variations, and they may serve to exaggerate the influence of more permanent factors, but no more. If values were determined solely, or chiefly, by such accidental factors, then this would be clearly shown in the speculative curve over a period of years. The movements would be purely haphazard. But they are not haphazard; examination of the various curves illustrated in this book shows, quite conclusively, a definite cyclical movement.

And there are good reasons for this. In the first place, whilst the Stock Exchange is peculiarly sensitive to "suggestion," it has unusual opportunities for keeping itself in touch with the actual position and immediate prospects of business. When there exist a large body of highly skilled and very intelligent men, in daily touch with all parts of the country and with every important branch of industry and commerce, devoting a large part of their capacities to a consideration of the probable trend of business, it would be surprising if their cumulative judgment were not of value to the solitary business man immersed in his own particular business. In other words, with all its defects, the Stock Exchange is an extraordinarily well-equipped forecasting agency.

Secondly, amongst those dealing on the Stock Exchange, there is always a considerable proportion with inside knowledge of the businesses the shares of which they are purchasing and selling. The owners of a business usually have a pretty shrewd idea of the immediate prospects of that business; very often they can base their judgment of its prospects for six months or a year, or more ahead, on actual orders placed, which are known to them but not to the business world generally. It is obvious that if it were practicable for all the business men in a country to meet together and state quite frankly the situation and immediate prospects of each business, it would throw a flood of light on the probable course of business as a whole, and on the best policy to be pursued by individual businesses. And to a certain extent the Speculative index does represent the composite view which would result from such a gathering. In this connection, it should be remembered, too, that this influence on the market is not confined to those operating with inside knowledge; the fact that these men are operating is soon known to a much wider circle.

Finally (without attempting to go deeply into economic theory), it is generally accepted that in highly-developed countries such as ours, financial factors have a very potent influence on the course of business. If "money" is abundant, production and commerce tend to prosper, and vice versa; and the Stock Exchange reflects these financial conditions. During a time of depression, money tends to accumulate in investors' hands. In course of time they begin to invest it, and the Speculative index tends to show a corresponding rise. In part, this investment is a consequence of improved prospects in business. In part, however, it is also a cause of improvement, because a portion of the money so invested is expended in new plant and so on, with a resulting series of beneficial reactions. The investment is a pebble dropped in a pool; the resulting circles ever widen. The underlying financial conditions which, in part, first stimulate investment, later stimulate production. The rise in the Speculative index is therefore, to this extent, a dependable indication of subsequent improvement in business.

Conversely, when money becomes "tight," owners of investments have to realize some of them to obtain liquid assets, while it becomes proportionately less profitable to hold investments with the aid of borrowed money. The consequent realization forces down the price, and compels or induces other realizations, with cumulative effect. The same financial conditions cause similar results in business; and in particular the fall in commodity prices. Therefore, again, the Speculative index is to this extent a sound indication of coming events in business.

It is in this connection that one realizes the importance attached to the movement of the speculative and money indices *in opposite directions.* A sudden and isolated fall in the Speculative index may conceivably be due to some temporary and unjustifiable swing in Stock Exchange sentiment, which is not subsequently reflected in business conditions. This, indeed, as we have seen, frequently occurs in practice, and is the reason why movements of the most carefully selected Speculative index cannot alone be regarded as an automatic guide to business fluctuations. On the other hand, a continued fall in the Speculative index, accompanied by a rise in the Money index, may confidently be regarded as a true reflection of fundamental financial conditions, and (with the Harvard type of chart) if the two indices intersect, a major change in the trend of business should be expected. The compass needle oscillates freely, but (if we allow for specific magnetic attractions) it indicates the north.

Whilst, therefore, there are some grounds for the criticism of the Speculative index as a thoroughly dependable scientific forecasting agent, it remains true that it is a very valuable aid to foreseeing the trend of events, because

1. It represents the skilled judgment of professional operators with unusual sources of information ;
2. It reflects to a considerable extent the inside knowledge of men in the businesses whose securities are quoted ; and
3. In conjunction with the Money index, it demonstrates the underlying financial conditions.

The practical business man may therefore sum matters up as follows.

In the first place, it appears to be quite clear from the experience of both pre-war and post-war years that he has not available any infallible and automatic guide to short period changes in the general volume of business. He cannot expect to forecast the waves, whatever he can do with the tides.

Secondly, however, it does seem as if he can obtain warning of major changes in the trend of business under normal conditions. If this be so, it is of the utmost value and importance. Business men can calculate for themselves how much it would have meant to them to have foreseen the slump of 1920–21, three to six months before it was upon them. In the case of one well-known British business alone, the greater part of a loss of £8,000,000 would have been avoided.

However, even as regards these major changes, the trade barometer is liable to be falsified by such incalculable things as war, widespread industrial strife, natural catastrophes like earthquakes or exceptional droughts, and so on ; while at times it is found extremely difficult of interpretation as a result of such abnormal conditions as the after-effects of war or the pursuit of a currency policy of deflation, or inflation, and so on.

The highest claim that can properly be made, therefore, is that a trade barometer (founded on the principles we have discussed) is a useful indication to the ordinary business man of major changes in general business. Further, if interpreted by someone with skilled knowledge, in the light of all surrounding conditions and available information, it should throw considerable light on the minor changes coming in the near future. Possibly, indeed, at this stage of our knowledge, even this is too high a claim. Perhaps it would be safer to say that such a person, with such knowledge, exercising a careful and informed judgment on the probable course of general trade, will find such a barometer of very real assistance.

One is anxious not to claim too much for business forecasting at the moment. The matter is still only at an early stage of development, and too extravagant claims would only tend to bring the whole thing into disrepute, as has happened to a considerable extent already in the U.S.A. At the same time, readers should not go to the opposite extreme of assuming that any assistance so to be gained in forecasting trade is so trifling and so undependable as to be valueless. That would be quite an unjustifiable position.

I tried to show, at the outset, that business men, willy-nilly, must forecast the course of general business. I hope that subsequent discussion will have supported this claim. No theory of trade forecasting so far developed will offer 100 per cent accuracy. But, *per contra*, judgment alone, or intuition, or the "practical sense of the practical man" (call it what you will), will scarcely guarantee 50 per cent accuracy. We surely learned that a few years ago! What careful and scientific forecasting (made by someone with the right economic and business training and pursuing right methods) will do, is to add perhaps another 25 per cent of accuracy to the judgment which must be made. If this be so, then, in a business of any magnitude, time and money wisely spent in this direction will be many times repaid. This would be so even if it did no more than foretell a severe slump once in every ten years! That it can do much more than this I hope I have proved.

CHAPTER VI

THE APPLICATION OF THE FORECAST

We can see now that the hypothetical manufacturer whom we left contemplating his hypothetical sales figures in Chapter II, cannot, in fact, take for granted that in the coming year general business will show the same features as it did five years before; or that it will follow the lines of any " typical " cycle, for the very good reason that there is no typical cycle. He may, however, take it for granted that there is a " *cycle*." That alone is a fact of vital importance in itself which is still largely unrecognized. Again, with the help of a Trade Barometer he should be able (abnormal conditions apart) to form a dependable judgment as to about where general business stands in the cycle; that is to say, whether in the depression, recovery, or prosperity stage. Furthermore, he should expect to get some dependable warning of when the next major change in trend of general business will take place. Finally, after adequate study, or with suitable aid, he should be able to form some dependable conclusion as to the course of general business during the coming year, and in particular during the next six months.

Of course, where abnormal conditions are likely to be present during the coming year, he must, as far as possible, allow for them, or provide against them. Where the condition is known (such as a continued deflation policy) he must make allowance for its probable effects. Where the event in question is possible, but may or may not occur (such, for example, as a widespread industrial disturbance), he must allow a certain margin for this contingency, arrange to get as long warning as possible of the event, and consider in advance the broad effects if the event occurs. As the war recedes, one may hope, however, that these abnormal conditions will tend to diminish.

We may assume, then, that our manufacturer has finally decided upon the probable general course of trade during the coming period. His next step is to discover the relationship between general trade and his particular industry and business. The curve of business is not the same for soap and for shipping, or for breakfast foods and for building. The prosperity stage in his business may occur simultaneously with the prosperity stage in business in general. If he is a manufacturer of final consumable goods, this is quite likely to be the case. On the other hand, his prosperity stage may precede or follow that of general business. The way to discover this relationship is to take his sales figures (or better still, if they are available, the sales figures of his industry) over a sufficient period of years, and, after eliminating the seasonal and secular variations, on the lines suggested in Chapter II, to chart the resulting curve in relation to the general curves of business selected by, or available for, him. If the two broadly coincide, he may use the general indices as the guide to his own probable business experience. If his cycle shows a time lag of, say, six months behind the general curve of business, then he will be in the fortunate position of receiving a longer and more accurate notice of coming cyclical changes affecting him, because the general business curve itself will be a second indicator. If his curve precedes that of business in general, then his length of notice will be proportionately reduced. Indeed, he may find that his circumstances are so peculiar that no general forecasting curve is of any help. In that case, he will have to discover, if possible, some other statistical series which experience shows does, in fact, indicate changes in the course of business in his particular industry. He may find this difficult. On the other hand, it is quite possible that the nature of his business is such that accurate indicators of its probable future can be devised more easily than those relating to general business. For instance, while a manufacturer of motor-car accessories is interested from a long distance point of view in all those factors likely to affect the sale of cars, he will have a very useful indicator of immediate sales possibilities in a curve representing the number of motor licences current from time to time. Or, to take a concrete example, an American manufacturer of saws and files found that a very useful supplementary indicator of future sales was to be found in an index combining (1) the F. W. Dodge figure of building contracts awarded (the saws being used chiefly for lumber used in building), and (2) the U.S. Steel Company's figures of unfilled orders. This was said to give a three months' warning of sales movements, supplementing two longer distance indicators based on credit and speculation.

On the question, however, of possible indicators special to his business, the business man must obtain independent expert advice. It is impossible here to do more than deal with the general case. One may perhaps, however, mention that the manufacturer or seller of consumable goods will find it worth while to construct an index of general purchasing power. This is not an easy task ; nor, indeed, one which can be fully and satisfactorily accomplished at all. For example, one wants figures for such an index not less frequent than monthly, whereas for the middle and well-to-do classes, no adequate figures are available more frequent than yearly, and then only after a long interval. Still, an index of working-class purchasing power may be useful in itself to those dealing in articles of general consumption, while it may also throw some light on the purchasing power of the community as a whole. One cannot even construct a completely satisfactory index of working-class purchasing power, but materials are available for quite a useful approximation. The first thing is to secure an index of working-class wages. This could be independently constructed, but I have found it desirable to make use of Professor Bowley's Index, based on eleven main industries, and published in the London-Cambridge Service. It is obvious, however, that purchasing power depends not only on wage rates, but on the numbers employed. The Wage index has therefore to be weighted in terms of unemployment by taking the excess or deficiency of unemployment at one date in relation to another (say, pre-war). A further question, then, arises, as to the extent to which a person's income is reduced on unemployment. The best approximation I can suggest is that on the average, taking men and women, with and without dependents, together, an unemployed member of the British working classes to-day has, either in State unemployment benefit, trade union or society benefits, poor law relief, or otherwise, an income about *half* what he would have if employed. This is a rough approximation.

If, then, we are calculating purchasing power in excess of pre-war, and the rate of unemployment is 20 per cent in excess of pre-war, we should reduce the Wage index not by 20 per cent, but by 10 per cent. This would give us an index of the *nominal* average income per head. If we then proceed to weight this figure in terms of the cost of living, we shall get an index figure of the *real* average income per head of the British working classes. Fig. 11 shows both these indices from 1919 to 1926. In view of the smallness of the scale, quarterly figures are shown. In day-to-day use, of course, the scale would be much larger, monthly figures would be used, and at any rate in the case of the cost of living figures, seasonal variations would, as far as possible, be removed. Such an index of purchasing power will be found useful not only in connection with forecasting, but also as a measurement of sales success. It should be noted, however, that to arrive at an estimate of the volume of purchasing power at a given date, as distinct from the index figure per head, allowance must be made for the increase in population and in numbers employed since the date with which comparison is being made.

As regards this particular chart, the most striking features are the comparative stability of nominal purchasing power since the end of 1922 (apart from the coal stoppage period in

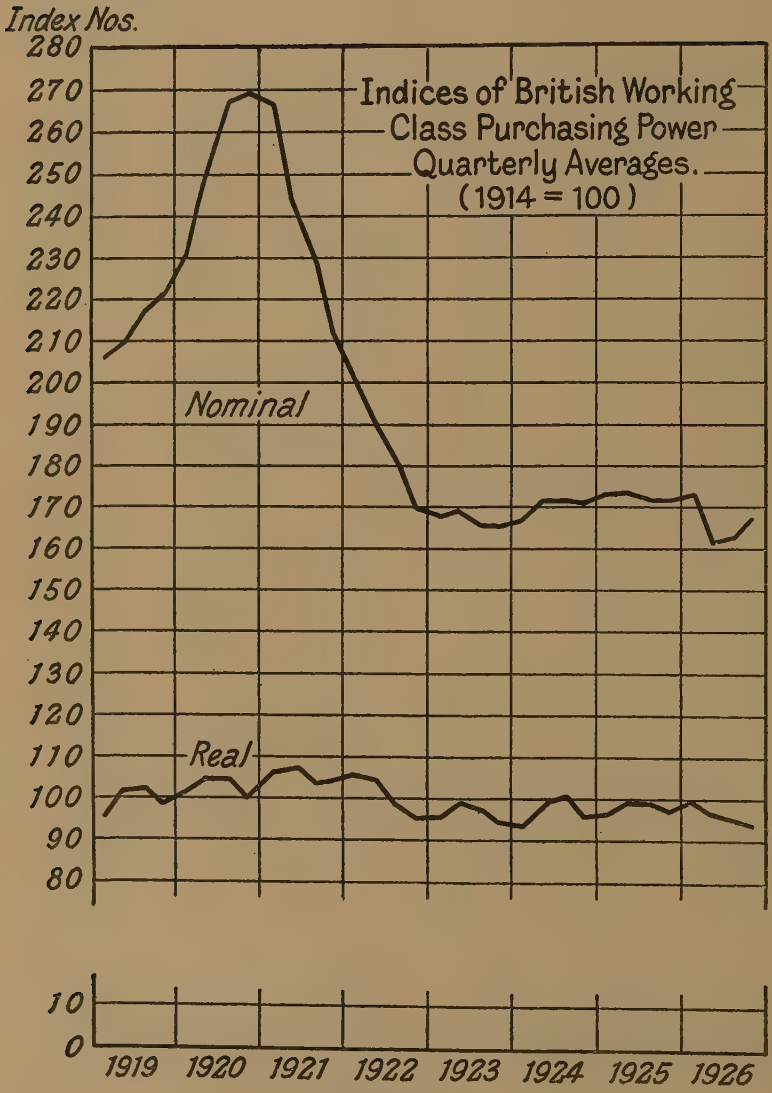

Index Nos.
280
270
260
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
10
0
Indices of British Working Class Purchasing Power Quarterly Averages. (1914 = 100)
Nominal
Real
1919
1920
1921
1922
1923
1924
1925
1926

FIG. 11.

1926) ; and the slight variation of the real purchasing power from the pre-war level throughout the period covered by the chart. The latter index has never varied up or down as much as 10 per cent.

But to return to our main theme.

By one means or another, our manufacturer will have arrived at some conclusion as to the probable cyclical trend of his forthcoming sales, up, down, or horizontally. He must next vary this figure so as to allow for the secular trend of growth or decline particular to his business, as indicated over a period of years. He will also make such allowances as his business knowledge and judgment dictate in respect of competition particular to his business—the commencement or rapid growth, or the recent bankruptcy or decline, of a formidable competitor, the advertising expenditure proposed in relation to past years, the introduction or development of attractive new lines, and so on. The final figures will then be adjusted for the seasonal variations (if any) which past experience leads him to expect. In this way he will gradually build up an estimate of his probable sales in the coming year.

If the necessary statistics are available, he can often usefully check or test this estimate in the light of the previous experience in his own business. To do this, he should chart his sales or business experience over a long period and then divide the curve by vertical lines into cyclical periods. He should then note at what stage in the trade cycle he appears to stand at the moment (let us say, twelve months after the end of a severe slump) and then look back to discover what sort of experience he has had in the past in the second year after a slump. In so doing, he may find that one particular cycle in the past closely resembles the present curve of business so far as it has gone. If so, the course of business during the ensuing twelve months in that cycle may throw considerable light on the prospects of the coming year. It will be noted that one says "may" throw some light. It must not be taken for granted that history will repeat itself. Some entirely new factor may have been introduced in the meantime, or some special circumstances may overshadow the whole outlook of the coming year. These things, however, will be known to our business man, and he will adjust his views accordingly. The important thing to realize is that past history very often throws a very valuable light on the future. If at any moment we had all the salient facts of the past before us, arranged in such a way as to throw the greatest light on the immediate problem before us, our mistakes would be far fewer. This is as true in business as it is in politics and in our private lives. The methods we are now considering are designed to throw this searchlight of the past on the dark places of future business.

By some or all of these methods, then, our business man arrives at his estimate of the coming year's sales; that is to say, his "sales quota." This is, of course, only an estimate. It is very unlikely to be 100 per cent accurate. Indeed, if it nearly approaches 100 per cent in accuracy the manufacturer will be fortunate. If, however, he will work out his forecast in this way, as scientifically as knowledge and conditions permit, he may confidently expect the result to be materially more accurate than if he relied solely upon his own judgment, or his own "hunch" as to the outlook. A real "hunch" is a very valuable (though exceedingly rare) gift. If it is a sound one, however, it will be supported by the use of more scientific methods, while if it is unsound these methods will give warning. Forecasting is not a substitute for judgment but an aid. It is a safeguard against taking a certain outlook as a result merely of the state of one's health or digestion, or of the newspapers one happens to read, or because one wants to take that outlook. It is so easy to jump to a conclusion, and then provide a logical basis for it; it is so much more difficult really to reason one's way impartially on the basis of proved fact; but it is proportionately safer. Judgment is often subjective; forecasting should be objective.

The sales quota is a figure of far-reaching importance. Its importance to the sales side of the business is obvious. To the extent that it can be made accurate, it enables the whole sales policy to be planned in advance. Sales quotas (with the aid of certain market research) can often be fixed for sales areas and for individual travellers, with manifest advantages. The traveller at a difficult time or in a difficult area feels that his efforts are being tested in the light of a reasoned standard. The sales manager has an independent measure by which he can check travellers' reports of their difficulties. Advertising policy can be regulated according to the estimate of the future. If the prospect for the year, for example, is that the first six months will represent the final culmination of a boom, to be followed by a severe slump—then, in all probability, advertising, or the solicitation of orders, during the former period, can be reduced to a minimum. For the time being the goods will sell themselves. Indeed, the situation may be such that goods have to be rationed, and efforts be concentrated on seeing that the available goods are sold to such of those demanding them as are likely to be financially strongest when the break occurs. On the other hand (if the product is one which is used at all in a slump period) advertising resources conserved during the boom may often be used with great effect in the slump. Such advertising would be brought to bear just when competitors were advertising little, either because, in their despondency, they felt that it would be useless, or, more probably, because the unforeseen slump had so weakened their financial resources that they simply could not afford the money. In such circumstances, a strong advertising campaign would be proportionately effective in its results. It would be used, too, in the wisest way, namely, to secure that evenness of demand which means so much from the economic point of view in lowered costs, and from the human point of view in steady employment.

In this and other ways, the pre-determined quota will help in sales and distribution policy. But this is only the beginning of its usefulness. The sales quota, in turn, will determine the volume of raw material to be available at the different periods throughout the year. If, for example, heavy sales are forecasted for the latter part of the year, the purchasing department can go on quietly accumulating the necessary materials at the most convenient time, instead of having to get them at short notice, when the demand is instant, with consequent risk of holding up production, and practical certainty of disadvantageous terms. Approximate estimates of minimum stocks required at different periods throughout the year can be made in advance and, so far as concerns the supply of materials, the purchasing division can be made to run with machine-like smoothness. This is quite apart from the effect of the general trade forecast on purchasing policy so far as price is concerned. That is a subject in itself which will be dealt with in a separate chapter. At the moment we are thinking only of the effect of the sales quota on quantities purchased.

Again, the sales quota has its immediate effect on production. Production, broadly speaking, is the more efficient and economical in proportion as it can proceed more steadily and rhythmically. It is under these conditions that one can obtain the maximum advantage of mass production, of mechanical aids, of dexterity of operation, of economy of packing and transport, of straightforward and effective planning and routing. It is under these conditions of steady production, too, that one may hope to have an effective and contented labour force; effective because it is worth while, and possible, carefully to select and train; and contented, because relieved from the constant nightmare of irregular employment. Production from hand to mouth is the antithesis of this. An unforeseen demand occurs. Existing employees are put on excessive overtime and engagements are hurriedly made of such applicants as are available, irrespective of their training or fitness for the work. Disorganization occurs; materials are not there when required, the respective processes do not dovetail into one another as they should, quality is lowered, and costs materially increased. Then an equally unforeseen break in demand occurs, stocks pile up, and staffs are hurriedly reduced. Workers whose training has, directly or indirectly, cost a good deal, are scattered, and unemployment results, with all its manifest economic and social ills. This is the sort of thing which goes on when a business lives from hand to mouth. In some it may be unavoidable. In most, at least, it can be greatly minimized by careful trade forecasting. If a strong demand is foreseen six months hence, stocks can steadily be built up at an economical cost of production. If a slump is foreseen, production can be slowed down in good time and stocks reduced to a minimum. Seasonal rushes (at least where the goods are not perishable) can be got through without seasonal peaks and troughs of employment, or at any rate with a material diminution of the distance between peak and trough. This is one of those many cases where business interests and social well-being can simultaneously be served by wise administration. No greater social service can be rendered to-day by an employer than by so organizing his business as to reduce his reserve of labour to a minimum. In so far as he succeeds in this by right methods, his profits will be proportionately swelled. One American business of world-wide reputation known to the writer carries this policy of planning ahead to such a point that it refuses to increase its productive capacity by more than 8 per cent per annum. It is satisfied by experience that it can confidently count on this average rate of growth, but not more, and if for a time it is unable to satisfy all demands it has the strength of mind to refuse orders. Another American business has made a provisional plan of the rate of its growth for fifty years ahead. This last may seem rather ridiculous in these days of change ; but an investment in a business which looks fifty years ahead is likely to be safer than in the commoner type which never looks ahead fifty days !

Finally, the planning ahead greatly aids the financial management of the business. To take the most obvious matter first, it provides a reasoned basis on which overhead charges can be based. To an increasing extent in these days of large and complex businesses, the question of profit or loss depends upon a correct handling of overhead charges. One business may fail because it includes in its price too little for overheads and therefore ultimately cannot pay its way. Another may fail because it includes in its price too large a figure for overheads, and therefore cannot get sales. It fails to realize how much overhead charges per unit can be reduced by a large turnover resulting from low price. Henry Ford is of course the classical example of the success of a realization of this last truth. Now a carefully fixed sales quota at once allows of overheads being spread upon a reasoned basis, so safeguarding the business against either excessive optimism or undue caution in the figure selected. It also reveals at once the possibilities of increased sales from reduced unit costs ; and on the other hand, brings under immediate scrutiny any item in fixed charges which tends to make overhead unit costs too high.

An effective forecast should, however, do much more than this. It should show the wisdom of restricting credit as the crest of the boom draws near, and of extending credit as soon as the worst of the slump is over and the weaker businesses have been weeded out. It should enable raw materials to be accumulated at cheap prices, and with cheap credit, in advance of the recovery stage. It should enable the finance director to estimate the capital and cash requirements of the business. The production division will report to him any additional capital expenditure required to produce the sales quota demanded, after taking full advantage of existing facilities by careful planning. The purchasing division will report on the minimum capital required to be locked up in raw material stocks. The equipment division will report on the extensions necessary to storage and transport facilities, and so on. The labour division will estimate the amounts required in wages at the different periods of the year. The sales division will estimate the amount to be spent on advertising, and the probable rate and extent of collections during the period, and the allowance for bad debts. On this basis, the finance division should be able to make a dependable estimate of the permanent and floating capital likely to be required in the year and to arrange in advance to secure it on the most advantageous terms. If additional floating capital is likely to be required only for a short boom period, then a short term borrowing can probably be arranged with the bank. If the capital is likely to be required for a few years only, to finance business at an inflated level of prices, then the necessary capital can probably most advantageously be obtained on short term notes. This will be particularly so if the price of capital for the time being is unduly high and financing on preference shares would mean the saddling of the business with a permanent charge at a relatively high rate.

Finally, if, as would quite probably be the case in a business sufficiently advanced to adopt scientific methods of sales forecasting, the whole of the estimated incomings and outgoings are collected into a "master budget," it should be possible to chart two simple curves representing this income and expenditure. Then, in the light of these, the short period cash policy could be planned. If at a certain period expenditure was expected for a time to rise above income, the situation could, to a greater or less extent, be met by the early discounting of bills receivable, by the offering of greater inducements to purchase for cash, and by the purchase of materials at longer credit. If, again, at a later period, the income curve was expected to rise above expenditure, the converse policy would be adopted. Thus, by planning finance ahead, the business would be conducted on a smaller margin of floating capital, with consequent greater net return on the capital used.

This matter could be dealt with at greater length, but sufficient has been said to emphasize the point which it is desired to make, namely, the very important advantages which flow in every direction from scientific trade forecasting and the careful forward planning made possible by that forecast.

One or two further aspects, calling more particularly for detailed treatment, will be dealt with in separate chapters.

CHAPTER VII

DETAILED SALES FORECASTING

So far, for the sake of simplicity, we have spoken of forecasting our " sales," as if all we had to deal with was the sale of one type of article, in one uniform sales area. It is quite recognized, of course, that things are not usually so simple in practice. There are businesses which deal in only one article, like a newspaper or the original Ford car; there are businesses which, either because they sell the whole of their output to one agent or wholesaler, or for some other reason, are constrained to regard, say, Great Britain as a single homogeneous sales area; but in both cases this is the exception. Most businesses deal in a number of lines, often of quite distinct types; indeed, it is not unusual for the number of separate " lines " to run into hundreds. The writer knows one case where the separate lines total over twenty thousand! Most businesses, too, are interested not only in the aggregate sales of a national market, but also in the particular sales in smaller sales areas, or travellers' districts. We must therefore carry this question of forecasting a stage further, so far, at any rate, as concerns sales and the production necessary for those sales.

It is evident that the sales prospects for a particular line during a future period may differ very considerably from the prospects for sales in the aggregate. This may be because the particular line is one for which the demand is practically constant, or is one which is rapidly growing or declining in public favour. It may be that the year's sales for certain lines may be close to the average for all lines, but the seasonal demand for them may occur at different periods of the year; for example, snow boots and tennis shoes, or " cough drops," and " thirst quenchers "!

It is clear that the further one gets from sales as a whole, and the more one goes into the details of particular lines, the more important will be the judgment of the business man and the technical facts special to that line. Nevertheless, in principle, the same *methods* are applicable to the forecasting of sales of particular lines as to sales as a whole. In each case, it is important to form some conclusion as to the secular trend, the seasonal variation, and so on, in the light of past events. In each case, in some degree, the prospective sales will depend upon the stage of the trade cycle. It is true that in many cases, such as, in particular, articles the demand for which depends upon the whim of fashion or taste, these broad general trends will be a minor influence. Even in such cases, however, it will be found that if a class of such products is combined into a more or less homogeneous *group*, the influence of these wider trends will become more apparent. Personal whims will be averaged out.

It would be a mistake to attempt to carry forecasting to too fine a point. To do so would only lead to unnecessary expense and disappointment. Nevertheless, if the goods produced are not of too changeful a character, and if adequate past records exist, a good deal of light upon sales prospects can be obtained by the application, at any rate, to groups of lines, of the principles applied to sales in general. In some cases, a great deal can be done in this way to aid the planning of production; as an instance, one may refer to the evidence of the Walworth Manufacturing Company, a business to which reference has already been made, where the lines are very varied and very numerous. This experience is dealt with in Mr. Barber's books, mentioned in Appendix I. How much can be forecasted in advance for particular lines, and how much has to be left to adjustment from time to time, in the light of current sales, depends, however, on the nature of the particular business and can only be determined by experience.

In the same way, it is clear that it is easier, in general, to forecast sales for a country as a whole than for a particular district of it. This is partly because separate statistics of general trade are not available for such districts. One can ascertain the foreign trade, or banking, or unemployment, or, to some extent, the production statistics, relating to Great Britain, but not those relating to Lancashire or Cornwall. It is partly, however, because the smaller the unit with which we are dealing, the less can we look to the law of averages for aid. We may overestimate Lancashire by 2 per cent and underestimate Yorkshire by 2 per cent. If, in these circumstances, we had made a composite estimate for the two counties, we should have been close to the result.

We must recognize, therefore, that the further we attempt to carry our forecast into detail, the greater is likely to be our margin of error. Nevertheless, the practical business of sales management will often require that independent sales quotas shall be pre-determined for counties or for other sales areas ; and where this is so, the more " scientific " the lines on which the forecast is made, the nearer is it likely to be to accuracy in the event.

Suppose, then, for example, that we have fixed our national sales quota, and want, let us say, to divide it, broadly, by counties. It is not suggested that a county is by any means always the best unit for this purpose ; one should seek, rather, an area which constitutes as far as possible an economic entity ; but the county will serve for illustration. The practical method (where one is concerned with an article of general consumption), is to make a broad analysis of the population from the point of view of probable purchasing power. This means, in effect, its division into certain broad groups. The human capacity for grasping and handling statistics is limited, and these groups should be as few as practicable. They should not exceed ten. One, of course, will be agriculture. One, in the case of a particular county, may consist of persons of independent means if they constitute a pronounced group. The remainder should then be divided into industrial groups selected on the principle of homogeneity of trade prospects. There will, for example, be that group including employees of the State, local authorities, and public utilities, and those approaching them in stability of employment and earnings. There will be the fairly stable groups of home industries, chiefly producing consumption goods. There will finally be the industrial groups, dealing with construction or primarily affected by export trade and subject accordingly to wide changes in prosperity. Some previous estimate will have been formed of the prospects of these main groups in the country as a whole for the coming period ; and the prospects of the county will be arrived at in the light of the industrial or occupational composition of its population. General sales prospects for example, in Northumberland will depend primarily on the prospects for coal, shipbuilding, engineering, and agriculture ; Lancashire on cotton and engineering ; and so on. Thus, an improvement of, say, 5 per cent may be anticipated in the country as a whole in a coming year ; but a particular county may be put at plus ten, and another at minus five. Incidentally, this more detailed estimate should form a very useful check on the accuracy of the original broad forecast. The forecasts for the particular areas should be aggregated, and the result compared with the original national estimate ; in fact, a sort of trade forecasting by double-entry !

Where the product is one not appealing to consumers in general, consideration will, of course, be confined to potential purchasers. Where those purchasers are to be found only in one industry, naturally sales possibilities in an area will be limited by the extent to which that industry is represented in that area. The actual prospects of the industry already will have been considered in fixing the national sales quota.

So much, then, for the splitting up of our sales quota into separate lines and different areas. There is another matter remaining for attention. So far, we have been considering sales possibilities primarily in relation to past achievements ;

and possibly that is all which strictly falls within the scope of the present book. There is, however, another point of view, namely, the relation of present sales to what those sales ought to be. The progressive business nowadays is always looking for more objective standards. We may have sold ten thousand articles of a given kind in the last twelve months, and we may decide that in the light of general trade possibilities we should expect, with current methods, to sell 10 per cent more in the next year. It is possible, however, that we ought to have sold twenty thousand last year and should look forward this year to twenty-two thousand. We want, therefore, to make some forecast of what sales should be in relation to the market possibilities. Any detailed discussion of this matter would take us too far afield. It falls rather in the sphere of market research or analysis. Nevertheless, it is very closely related to what we have just been discussing. So soon as we attempt to divide up our national quota by districts, we shall come across all sorts of anomalies. We may discover that in one county sales are just twice what they are, say, per head, in a comparable county; and this will lead us to inquire at once as to whether this is due to varying competence in our local representation and in sales and advertising efficiency, or to some other factor external to our business. We shall thus be faced with the question, What *should* be our sales in such an area? We shall then wish to "forecast" objectively what our sales ought to be. Furthermore, such an inquiry may form a very interesting check on our original general forecast.

What we want to do, then, is to measure our available "market." A "market" originally meant a place; all the potential buyers were present, and it was a simple matter to form a conclusion as to the sales possibilities. A "market" to-day in commercial usage means something much wider; when we speak of the market for a certain stock we have in mind all possible purchasers, wherever they may be. It is therefore much more difficult to measure, but in principle it is the same. Our aim must be to estimate its potentialities with as close a measure of accuracy as possible. It may seem to some almost a hopeless task, but it is extraordinary what patient and intelligent research can achieve. Not very long ago, the ordinary manufacturer would have been incredulous about the practical sense (if he even admitted the practical possibility) of measuring each minute part of the cost of a particular article, including the cost of each minute operation. Indeed, he probably confined himself to his annual Profit and Loss Account. Now, such detailed knowledge is regarded as almost a *sine qua non* in well-managed factories. The accuracy of measurement which has been applied to production will very soon be regarded as essential also on the side of distribution. The haphazard business is not going to survive very much longer.

Markets are capable of practical measurement, even though we cannot expect results without some considerable margin of error. A bridge builder cannot estimate, except within fairly wide margins, just exactly what strength is required to take a certain stress, but he does not on that account dispense with measurements ; on the contrary, he uses the most refined methods available, and seeks always for increasing refinement. If so far as we have not been able to measure markets, it is because we have not taken the trouble to collect all the available data and to subject them to the most careful measurement and analysis. We must apply to distribution the same principles of scientific management (it will perhaps be put to the writer's credit that this is the first time he has used this term !) as have achieved such remarkable results in production. While, therefore, any detailed discussion would be out of place here, one does feel that some reference to the subject is necessary to proper appreciation of the sales forecasting problem as a whole.

The way to go about the measurement of the market will depend upon the nature of our product. If we are selling, say, a motor accessory, we can confine ourselves to the number of motorists; or, possibly, even to the number of motorists using particular types of car. The same principle would apply to the sale of textile machinery, or ball bearings, or steel plates; we would limit our efforts to the discovery of all potential users of our specialized products. If we are selling something for old ladies only, we need simply add up the old ladies. Where our product is one of general consumption, the problem is much more difficult. We have then to discover some unit by which we consider we can fairly measure our sales possibilities.

The most obvious is that of the numbers of the population in the area. This is always a useful figure to begin with, in the case of any article of general consumption. No business man can measure his sales *per capita* in different districts without obtaining some light on his sales problems. The simple counting of heads, however, will seldom carry us far. For instance, if we are selling cigarettes, we want to eliminate children under sixteen, and to attach a heavier "weight" to the numbers of males than to females. Again, our product may be such as to sell, broadly speaking, only to people in a certain position. We must make up our minds, then, as to what is the approximate minimum income of potential buyers, and seek to eliminate from our total figure of population all families (or individuals) under that income. We can ascertain numbers in certain income classes for the country as a whole from the income-tax reports; but we cannot get such figures by districts. We must, therefore, make use of such information as is available. For example, census reports will give us the number of people living in houses of more than three rooms, five rooms, nine rooms, and so on, and this may be a very useful guide. A similar guide will be found in rateable values; and supplementary information can be got by considering the number of families with domestic servants, the number of private houses with telephones, and so on.

If our product is one of practically universal consumption, probably our problem is most difficult of all, because then we shall want some measurement of the purchasing power of the district. This can only be very approximately estimated on the basis of analysis of the population into occupational groups, and the allotting to each group of some rather arbitrary estimated average income. In this way, however, we shall arrive at some rough idea of how the purchasing power of, say, Cornwall compares with that of Lancashire.

So far, we have been discussing the measurement of sales possibilities by means of statistics available in census reports, and in other similar book form. It may be that the particular information we want is not available in any such form, and that we shall have to collect it by field inquiries ; and, of course, in any event we shall have a considerable volume of knowledge available in our own business by which we can test, and with which we can supplement, the available statistics.

Having selected some appropriate unit of measurement, we test our sales against it in each area. We may find no sort of regular correlation at all. In that case, we must seek for a better unit of measurement. We may, however, find a fairly close correlation in a majority of areas, with a distinct falling below this average in others. In that case, we may make the prima facie assumption that our sub-average sales are due to some lack on our part in those areas. If careful inquiry confirms this view, then we must seek gradually, by better representation or better methods, to raise the sales of these sub-average areas. This will mean the modification of our previous sales quotas for these areas (based so far only on past and present sales) by special additions representing the instalment of leeway we consider can be made up in the current period.

So far we have assumed that what we want is the measurement of the market for a product we are already selling. It will be obvious that a market analysis will be very much more valuable in the case of a contemplated new product. Indeed, there, it constitutes the only alternative to a costly process of discovery by trial and error. The development of more careful and scientific market analysis is bound to come, as it has already come to a considerable extent in the U.S.A. Remarkable work has been done by such businesses as the American Telephone and Telegraph Company, the National Cash Register, Burroughs Adding Machine, to mention only a few of the first which occur. One business has ascertained and charted its sales possibilities not only by states and by towns, and by town districts, but down to " blocks " for every part of the U.S.A. ! It is surely possible to envisage the time when even a lawyer or an accountant will not establish himself in business, or purchase a partnership, until he has had an expert analysis made of the number, type, and purchasing power of his potential clients in that area.

CHAPTER VIII

FORECASTING PRICES

We have been looking at forecasting up to this point primarily from the point of view of sales, although we have recognized its indirect effects in other spheres. In manufacture, however, equal (or even greater) importance often attaches to forecasting the prices of raw materials. Some necessarily brief reference, therefore, must be made to the question of forecasting prices.

It is obvious, in the first place, that the level of *prices in general* is subject to that same cyclical movement to which so much reference has been made. Indeed, we have seen that the price level is used as one of the chief indices of cyclical variations in business. The consideration already given to sales will therefore provide the basic information with regard to the general course of prices. If an immediate slump is indicated, then (special conditions apart) we should obviously buy as far as possible from hand to mouth. If improving business is forecasted, then it will in general be wise to buy well ahead. In every estimate of the probable course of price of, say, a particular raw material, therefore, consideration must be given to the general trend of the price level, which means, in turn, consideration of the general position of business in the trade cycle. This last is particularly necessary in the case of commodities where speculation is an important element; because cheap money induces the speculator to buy, and dear money compels him to liquidate his holdings.

While, however, this consideration is important, by itself it will form no sufficient guide to purchasing policy. While the general tendency of prices may be upward, the tendency in the case of the one in which we are immediately interested may be downwards; and vice versa. In each case, therefore, we must consider the particular circumstances of the commodity in question.

As regards methods of forecasting price changes of particular commodities, we can offer no particular "art and mystery." The methods adopted by an economist in buying would probably only represent an elaboration and systematization of those already used by the average buyer. Such a buyer probably has developed over a long period an intimate and valuable "market sense." He exercises this in the light of such apparently important statistics as may be immediately available and with due regard to brokers' and other advice. The economist (or at any rate, the economist who has any practical acquaintance with business) would appreciate to the full this practical market sense of the buyer. He would seek, however, to aid practical judgment by a wider and more systematic collection of statistics and by their more scientific analysis and representation. In this way he would leave the purchaser's judgment as the final operative factor; but would seek to assist it by presenting a bird's-eye view of the whole statistical position of the commodity, and by an indication of the conclusions to which such statistics pointed. The rather detached and long-period point of view of the economist would be complementary to the immediate and intimate knowledge of the buyer. In certain cases (for example, with regard to an agricultural product), where very full information is available, not only as to the past and present position, but also as to the probable harvest, and where there are no important disturbing factors to be allowed for, it may be possible by refined statistical methods to establish definite correlation between supply, demand, and price, such that price changes can be forecasted up to a point by the mere application of a formula. This, however, is a matter the discussion of which would take us quite beyond the scope of this little book. Where it is thought that such a possibility may exist, the advice of an expert statistican should be sought. We will confine ourselves to more everyday methods.

One cannot compress a price theory into a paragraph!

Very broadly, however, the immediate price is determined by available effective supplies in relation to presently effective demand ; while the long period price is determined primarily by the cost of production of the quantity effectively demanded. In each case, of course, certain particular factors will have to be taken into account in arriving at any conclusion, for example, whether demand for the particular commodity is elastic (that is to say, whether a small change in price will result in a large change in demand) ; whether production is operating under conditions of increasing or diminishing return (that is to say, whether the greater the production the cheaper the cost per unit, as in the case of, say, steel, or the reverse, as in the case of wheat) ; and so on.

We have first to secure the facts and then to exercise our judgment upon them. Let us take as our example a raw material of international use, like tin or sugar.

The first thing to do is to secure statistics of production, consumption, stocks, and price, over a substantial period of years, including years of boom and depression, and, in present circumstances, of pre-war as well as post-war. The fullest possible statistics should be secured. We should not rest content because they are not immediately available. Any we get should be carefully scrutinized ; produce market statistics, in particular, are often very unreliable and misleading. A good deal depends upon the source ; so far as possible we should seek official figures. Especially in brokers' and similar reports, allowance should be made for interest and bias. Furthermore, we should be extremely careful to see just exactly what they represent, and in particular that those in a series are strictly comparable. A slight variation in the standard or quality of the goods, or in the unit of measurement, can materially falsify our conclusions.

Having secured these, they should be analysed and treated in such a way as to bring out their full and true significance. For example, in the case of prices, inquiry should be made as to whether there is a fairly regular seasonal variation, and, if there is, this should be separated from the longer period variations by methods similar to those dealt with above in the case of sales. This will at one and the same time (1) make clearer the true significance of non-seasonal movements, and (2) enable a forecast to be made of probable seasonal movements in the current year.

The ultimate figures should then be charted in such a way as (1) to enable a complicated series of movements to be grasped at one bird's-eye view, and (2) to bring out the true significance of the variations in movement. The use of charts, as of anything else, can be carried to excess. On the other hand, one can safely guarantee that a reader who for the first time does no more than merely chart intelligently the available statistics relating to a commodity which he is in the habit of buying will be surprised at the increase in clarity of his views. In particular, he should try the use of the ratio type of chart referred to in Appendix II.

Having thus prepared the relevant information, it should be carefully studied. At what average rate has *production* grown over a period of years? Have there been great variations from year to year; or has the rate of growth been fairly constant, in such a way as to suggest its continued growth (or decline) at that rate? Are there numerous sources of supply or few? Are these, or the more important ones, subject to the possibility of sudden variations due to economic or political reasons? Have any new sources of supply been recently discovered, and if so, what has been the effect on other sources of supply, and on price? How long does it take for a substantial change in price to be reflected in future production? In the case of a crop, for example, does a harvest follow within a year of planting? Is subsequent production extremely sensitive to price changes or the reverse? Is the commodity a sole one, or one produced in conjunction with another, like wool and mutton; and if the latter, which price has the more important effect on production ? Are there substitutes or alternatives available, and if so, at what price, and what effect have they on production ? Have the producers any alternative, to the production of which they can turn without material difficulty and expense ? And so on.

What has been the average rate of growth of *demand* over a period of years ? Has demand shown sudden variations from year to year, or has the rate of growth corresponded closely with the average in such a way as to suggest that we may expect an average increase in demand in the coming year ? Is the commodity one where a fall in price will result in a large increase in consumption (as in the case, for example, of sugar) or the contrary (as in the case of wheat) ? Have there been any recent developments causing an unusual increase in demand for the product (for example, rubber for motor tyres) ; or vice versa ?

As regards *stocks*, what appears to be a normal ratio of stocks at a given part of the year ? Have stocks tended to bear a definite relationship to production or consumption ? Is it important to know not only the total world stock but also (1) the stocks in different countries, and (2) the composition of the stocks as regards quality or grade, and so on, and can this information be got ? Do the statistics show how much of the available stocks is available for sale and how much is in consumers' hands, and if so, what has been the effect on price of changes in this ratio ? Are invisible stocks important, and, if so, what ratio do they tend to bear to visible stocks ? Variations in invisible stocks may be very considerable and exercise an important influence on price ; for example, after a period of low prices they may be unusually heavy.

As regards *price*, we shall have already asked ourselves whether there have been any important changes in the value of money (such as the striking ones since 1914) such as to affect the comparability of prices over the period. If there have been such, we shall have brought all prices to a comparable basis by adjusting them in the light of suitable index figures. For example, there may be a sort of tradition in a market that the price can never be maintained in excess of £*x* per ton. But if £*x* is only 25 per cent in excess of the pre-war price, and the general price level is going to stabilize at something like 50 per cent over the pre-war level, this tradition may require overhauling. We shall also have inquired whether there is a definite seasonal variation, and if so, we shall have made allowance for it.

Taking these refined figures as our basis, we resume our inquiries. Has the price shown a uniform growth or decline over the period; has it remained fairly stationary; or have there been sudden variations from year to year? Has it tended to follow the general level of prices or to rise above or fall below them; and if the latter, can we reasonably expect this tendency to continue; or has some sudden change in supply occurred to alter this relationship? Where variations have occurred, do these seem to bear any definite relationship to (1) stocks in hand at the moment, (2) current supplies, (3) prospective harvests or supplies, or (4) changes in demand? If so, have these changes been sufficiently definitely related to other factors to enable us prudently to forecast what will happen to prices in the current year, given a certain statistical position with regard to supply and demand? What has been the relationship of price to cost of production? Has it fallen below it at times, and if so, for how long and with what result?

These are indicated only as the sort of questions to be asked. Others will suggest themselves in relation to the particular commodity. A painstaking examination of the statistics over a sufficient period of years should throw a great deal of light on what is likely to happen to price in the future in certain given circumstances.

The last thing is to bring our information as far as possible up to date. In this connection it will be found useful to prepare at least three charts. The first should show cumulative monthly totals of production for the past two years and for the current year, charted against one another so as to show at a glance just how to-day's figures compare with those of a year and two years ago. Where appropriate, separate charts should show the position with regard to each important source of production, and then one aggregate chart sum up the position of world production as a whole. It may be advisable to add figures for the last pre-war year as well.

Similar charts should be prepared with reference to consumption, except that of course in this case the subordinate charts will relate to the more important consuming countries for which statistics are available.

Finally, charts should be prepared in the same way with regard to stocks, or visible supplies, save that, of course, in this case the figures will not be cumulative but will represent the actual stocks in different countries at different dates.

In the light of these figures and of the latest estimate of current production, it should be possible to make some reasonable estimate (at any rate in the case of those international commodities of which pretty full statistics are available) of the probable production and consumption during the year and the stocks likely to be in hand at the end. These estimated figures can be charted in pencil on the original long-period chart showing production, consumption, stocks, and prices over a long period of years; and if the whole position is then considered in the light of our previous investigations we should usually be able to secure some valuable guidance as to our purchasing policy. In particular, we should hope to decide whether the long-period trend of prices during the year is likely to be up or down.

One cannot therefore offer any magic formula for forecasting prices with automatic accuracy. Indeed, if one could, the world would be at one's disposal! What one can do, however, is to submit that where adequate statistics are available, their careful and systematic collection and analysis will be found of substantial value to the buyer. Such methods are not a substitute for skilled buying and market sense; they are auxiliary and complementary, serving to test the buyer's "hunch" and to reinforce his judgment.

As was said, certain refined statistical methods may be applicable in certain cases where the article is a standard one, where very full statistics are available, and where the market is fairly free from unusual disturbing factors. A discussion of this subject would, however, be quite beyond our present scope. It is a matter for an expert statistician in the particular case. However, even the more homely methods we have described may give just that slight lead over other buyers which is so important. Most buyers follow the market feeling of the moment, all using the same statistics together, those statistics in turn usually being only fragmentary and immediate. Furthermore, they tend to stand off as long as prices are falling (even though a very attractive level may have been reached), and to rush in and buy on a substantial rise (even though it may not be justified by the statistical position). They tend to buy, therefore, at a price above the market average. The successful buyer is he who anticipates, and often goes against, the crowd, as the "big men" in finance, banking and market operation know; that is why they are big men. These simple methods may be just sufficient to give the buyer the necessary advantage.

If it be objected that buying in anticipation of a rise is speculation, the answer is that most manufacturing where raw materials are an important item in costs is necessarily to a greater or less extent speculative, and that being so, it is wise to be as well informed as possible. Furthermore, it is no more speculative to buy in anticipation of a rise than to refrain from buying in anticipation of a fall! Where one can buy continuously from hand to mouth and still ensure supplies, this may conceivably be wise in certain cases; but it does not often so happen in practice. Where there is a "futures" market it may be possible, of course, largely to eliminate the speculative element by covering contracts as they are made, and throwing the risk on to the speculator; which is the latter's true economic function and justification.

CHAPTER IX

INVESTMENT FORECASTING

THE forecasting of future investment prices is obviously far too large a question to be dealt with here in any detail, whilst any attempt to outline very briefly a complete theory of investment fluctuations, or an investment policy founded on such a theory, might be very misleading. Nevertheless, it will be obvious that the theories we have been discussing have a very material bearing on the forecasting of investment prices, and it seems desirable, therefore, that at any rate sufficient should be said to awaken the reader's interest and suggest lines of exploration.

For our present purpose, investments can be divided very broadly into two classes, Speculative (used in the economic sense, and not in the sense of hazardous) and Fixed Interest. The typical example of the former is the ordinary or deferred share or common stock of a business enterprise. The typical representative of the latter is a first-class irredeemable gilt-edged stock. In between these two extremes are numerous gradations, and opinions may differ as to where exactly the boundary should be drawn between the two classes. For instance, a first-class industrial debenture would fall for our present purposes into the Fixed Investment class. A preference share in a business, particularly if it has no large backing of ordinary shares, may for practical purposes fall in the Speculative class, in the sense that it may fluctuate in value in accordance with varying business fortune. A first-class preference stock may, however, be as secure as a Government stock; and in that event for practical purposes may fluctuate like a Fixed Interest stock. No completely satisfactory line of division, therefore, can be drawn. For our present purpose, however, we may include in the Fixed Interest class all those investments where the owner is in effect a *creditor* entitled only to a certain fixed return, with or without the right to ultimate repayment of capital; and in the Speculative class, all those where the owner is in some degree a co-adventurer in an enterprise involving risk.

Now, again, speaking broadly, the value of the Speculative investments will tend to change with the fortunes of business, while the value of the Fixed Interest will vary in inverse ratio to the rate of interest; that is to say, first-class fixed 5 per cent investments (other things being equal) will tend to rise by 25 per cent in capital value if the long-period interest rate falls from 5 per cent to 4 per cent. It is not suggested that this is a complete statement of the case. Furthermore, it is clear that the value of a particular investment may differ from the average of its class. A particular business may be so successful or so ably managed that its shares go through a slump without experiencing anything like the average fall in Speculative stocks. Again, the value of a fixed interest stock will be affected by any weakening in the credit of the debtor; for instance, the bond of a particular South American Republic may be falling simultaneously with a fall in interest, because of doubts as to the chances of payment of interest and principal. These, however, are the exceptions, which prove the rule. For forecasting purposes, we can say in general terms that Fixed Interest stocks vary inversely in value with the long-period rate of interest, while Speculative stocks vary directly with the position and prospects of business. Furthermore, the very slump in business which causes Speculative stocks to fall in value, gradually leads to the accumulation of liquid funds and a falling-off in the demand for short-period financial accommodation; which reduces the value of money and so should in turn tend to increase the value of Fixed Interest stocks.

The relation of this to our present subject will at once be perceived. The Speculative index on which we have so largely relied to indicate future business is itself the index representing the average values of representative speculative stocks. We have seen that it shows a definitely cyclical movement. It follows therefore that if we simply retain our capital in a sufficient number of average speculative stocks, we shall (subject to long-period changes in the value of money), after a sufficient period, always be substantially where we started. That is to say, our holdings will rise in value, fall, and then recover, in accordance with the trade cycle. If, however, we could foresee matters sufficiently, we could sell out our holdings always just at the peak and then re-invest them at the bottom of the trough, and so secure all the capital appreciations and avoid the capital losses.

We cannot, of course, hope quite to achieve this, but we ought to be able by intelligent foresight to achieve a better result than we should by simply holding the same type of stock indefinitely.

We saw in the earlier chapter that apparently the Speculative, Business, and Money curves move in a certain more or less fixed relationship to one another. We were trying to forecast Business and we therefore looked at the matter solely from the point of view of the light which the Speculative and Money curves would throw on the Business curve. We should now recall that if there is in fact this relationship, we should hope that the Business and Money curves would in turn throw similar light on the movement of the Speculative curve; and this is so, though the guidance is not so clear as in the former case. If reference is made to Figs. 3 and 4, it will be seen that the movements of the different curves do throw considerable light on the coming changes in the Speculative index. For example, in Fig. 3, the rapid rise of the Business curve in 1905, accompanied by a rapid rise in Money, betokened a coming fall in the Speculative index, and the same thing appears in 1909 and 1912. The point need not be laboured. If the broad theory of business forecasting be sound, it follows that the same barometer must throw some light on coming changes in the value of industrial Speculative stocks.

We can therefore hope to be able to realize our Speculative holdings somewhere near (if not actually at) the top of their rise. If at the time we actually require the cash in our business (as the business man often does at this time) then our course is clear. If, however, the alternative is to put our cash on deposit and wait until we feel assured that the slump has reached bottom, then for a considerable part of the cycle our earnings will be very nominal, although we shall enjoy a favourable capital position.

If the Fixed Investment index were complaisant enough always to move in inverse ratio to the Speculative index, the position would be simple. We should simply sell our Speculative stocks and invest in Fixed Interest, and so on in rotation, enjoying a capital appreciation in turn on each investment. However, things do not quite work out like this! Nevertheless, the careful investor may often find it the most profitable course to sell out his Speculative stocks at a certain point and invest in Fixed Interest. He may not enjoy a capital appreciation, but he will be certain of his annual return, while he may hope that any capital depreciation which occurs will be much less violent than in the Speculative group.

Fig. 12 is a chart showing respectively the twenty Industrials and the Fixed Interest indices of the London-Cambridge Service from 1919 to date. The most striking feature is the relatively small oscillation in the Fixed Interest index as compared with the other. Other features can be noted, though discussion of their causes would carry us too far afield. Note, for example, that during the steep rise of the Speculative index up to February, 1920, the Fixed Interest index was falling; and that while the former has risen greatly from the beginning of 1922, the latter is substantially where it was.

If an investor had invested £1,000 in representative Speculative stocks at 154 in January, 1919, and sold them a year later at 295, and invested them in representative Fixed Interest stocks at 68·8; and then in turn sold these in October, 1921, at 66 and bought Speculative at 103, his £1,000 in January, 1926, would have been worth £3,408, apart from any income received in the meantime. This is a hypothetical result which one could scarcely hope exactly to have achieved in practice. Nevertheless, the reader will remember the claim of the Brookmire Economic Service, mentioned in an earlier chapter, that a person investing $10,000 in 1907, and following the Brookmire forecasting line (which claims to forecast the Speculative index by a month) would have had by June, 1922, over $108,000, or a capital increase at the rate of 28 per cent compounded annually.

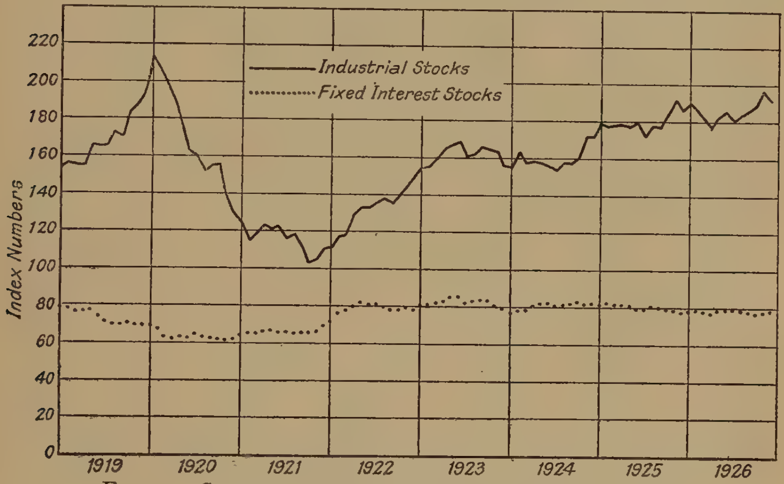


FIG. 12. CHART OF INDICES OF INDUSTRIAL AND FIXED INTEREST STOCK PRICES (1913 = 100).

This discussion has perhaps been sufficient to open up the subject to readers. It would be out of place to carry it any farther here. We are not formulating any precise theory of investment forecasting, still less are we suggesting that there is any automatic rule for getting rich quick. All that is said is that a suitable trade barometer can be expected to assist the judgment of investors. They will still have to exercise that judgment as to the general outlook; and will have to select their investments in the light of the particular merits of each. They will have to bear in mind also important factors such as the long-period trend of money values. In a previous chapter we suggested that a manufacturer, in deciding how to finance his business, would have to consider whether the price of money was rising, in which case he would provide for long-period financing, or falling, in which case he would seek to get the capital he wanted on short term notes. The investor, of course, will have to consider this same question from the reverse side. Consideration of the long-period tendency in this direction may outweigh the short-period indications of the business barometer.

To repeat, a business barometer is not a substitute for judgment either in investing or in anything else: it is simply a valuable aid.

CHAPTER X

CONCLUSION

DURING the first quarter of the twentieth century efficiency in production has gone far ahead of efficiency in administration and distribution. We have effected enormous economies on the mechanical side of production; we have much to learn yet in the way of securing the co-operation of management and labour in that production; we have much, too, to learn in the arts of purchasing, finance, and distribution. During the next decade our attention in industry will probably be chiefly centred on these latter problems. It would seem, too, that they will only be solved by the patient application of those same scientific methods which have proved so successful on the mechanical side. We are concerned here primarily with the last group. It is true that any diminution in the severity of the swing between prosperity and depression will reduce unemployment, and to that extent ameliorate and simplify the human problem in industry. We have not, however, set out to consider the matter from that point of view. We are interested in the swings in demand primarily from the point of view of their direct effect upon sales, and their indirect effect upon production, purchasing, finance, and the other spheres of business.

The old-fashioned method was for the business man to consider the results of his business only when he came to make up his accounts at the end of the year. The new way is not only to scrutinize those results day by day throughout the year, but to plan them in advance. And, after all, this is the rational method; because most departments in a business are working on their expectation of future orders and future conditions.

The business man has seen the advantages of budgetting in advance. He has appreciated the example of the National Budget. His difficulty in adopting the budget method himself, however, has lain in his belief that his sales could not be forecasted in advance. It will be clear from what has already been said that no estimate of the future can hope to be 100 per cent accurate; and to this extent he has been right. At the same time, it should also be clear that much can be achieved in this direction, and that whatever facilities are available in the way of scientific forecasting should be used to the utmost. This is on the simple principle that there is much more hope of working a train to its destination at the desired time if we know in advance first by which route it is going, and secondly at what times it should arrive at intermediate points!

Every business man tends to claim that his business "is different." To a certain extent that is true; every business is different, but on the other hand it is equally true to say that every business works in accordance with the same general economic laws and that to every business the same broad principles of business management are applicable. Every patient is different; but each benefits from the findings of medical research, and from the application of the same principles of healing.

Forecasting, it is objected, can only judge by external appearances, which may be misleading. The same thing exactly applies to doctor and patient. The doctor's diagnosis cannot be perfect; he judges by external symptoms which may be misleading, but we still consider it worth while to make use of whatever service the doctor can render.

The "big men" in business have always acted on the principle of keeping in touch with the big factors external to their business, and anticipating their future course; though often, it is true, they may have done this unconsciously. Morgan and Harriman, when they were carrying out their Napoleonic business plans in the U.S.A., had, in fact, in their businesses, what we should now call "research departments." Their example has been followed in the more far-seeing American enterprises, and to-day it is said that over five hundred American businesses have their " business research " departments. It is true that these include very varying types, and that many consist simply of what would be called costing or statistical departments in Great Britain. Nevertheless, many of them are business research departments in the full sense in which we should understand the term. Mention has already been made of some of these businesses, such as the American Telephone and Telegraph Company, the Walworth Manufacturing Company, the National Cash Register Company, and the Burroughs Adding Machine Company. Many others might be added, such as the Edison businesses, Dennisons, the Tidewater Oil Company, and so on. Men in charge of these businesses have seen that business management must bring (as someone has said) " inside knowledge with an outside perspective, and an outside vision with an inside knowledge." They have seen that with our complex, closely inter-related economic system no business and no country can live without regard to others ; but that all this mass of external factors must be studied and its changes anticipated and its effects on their particular business appreciated. They have justified the faith that was in them by the amounts that they have been willing to spend.

Enlightened British business men are appreciating the same thing to-day. Take, for example, the following extract from Colonel the Hon. Vernon Willey's 1926 Presidential Address to the Federation of British Industries : " The task before British industry at the present time is to realize that it is in a world where conditions have already changed fundamentally from those of the pre-war world, and in which conditions are still changing rapidly ; that if it is to live in this new world, and offer a reasonable standard of living to the millions who are dependent upon it, it must become more flexible, more efficient, more far-seeing. It must have greater knowledge of itself and of the surrounding circumstances in the world which affect it."

It must have greater knowledge of the surrounding circumstances in the sense of accurate information as to present conditions, present tastes, and prejudices, and so on. But the process of acquiring this knowledge will lead it irresistibly to the question of things not as they are but as they will be—in short, to the forecasting of changes in these external circumstances which so intimately affect its future prosperity.

Any such inquiry will lead at once to this dominating factor of the trade cycle—the cyclical movement of industry—this pulse beat of business. That will no doubt lead to the question of how to minimize this alternation between prosperity and depression, and much economic and social advantage may be gained from such inquiries, as knowledge of the subject grows. Meantime, however, this movement (be it great or not so great) must be accepted as an outstanding fact, its widespread influence realized, and business policies shaped in the light of it.

What, then, can a business man do to secure this "outside perspective" and this "outside vision" which are so important? In the first place he can subscribe to an economic or forecasting service. We have already mentioned the Harvard Economic Service, the Brookmire Economic Service, and the Babson Statistical Organization in the U.S.A. The only corresponding service in the United Kingdom known to the writer is the London and Cambridge Economic Service described in Appendix I. This gives each month a considered note on the "General Business Position." This note takes into account the major position suggested by the "forecasting" lines, the recent tendencies shown by all existing statistics, and any light thrown on the situation by other current phenomena. It is, however, a diagnosis rather than a "forecast." Indeed, it refrains from making a "forecast" in the sense in which we have used the term; partly, no doubt, owing to proper caution in the early years, partly because it is not yet finally established that the sequence developed by Harvard for pre-war conditions is applicable to normal post-war British conditions, and partly because (as Professor Bowley wrote in a crisp summary to the writer) during the past six years normal tendencies have been deflected by " a succession of financial earthquakes, deflations, inflations, reparations, Ruhr occupations, strikes, etc." A business man, however, with the aid of this Service, should at least have warning of the major changes in external business conditions. It is interesting in this connection to notice that the Harvard Service accurately predicted the slump of mid-1920 in January, 1920, and the revival of 1922 in the autumn of 1921. One can leave to the reader's imagination the value to British business of an authoritative warning on similar lines in Great Britain in 1920.

One would hope for a great deal more assistance in proportion as the London-Cambridge Service gains the adherence of British business men. One looks forward to the day when there will be a far closer relationship between the academic and the business worlds; when men with practical experience of business will form an essential part of the staff of a University School of Commerce and Economics; when university lecturers will regard the large factories and businesses of Britain as the retail stores where they can display their wares and bring direct help to the business man in the perplexing problems with which he is faced; and when it shall be a normal thing for men to pass and re-pass from one sphere to the other. One would hope, too, that in time such a venture as the London-Cambridge Service will develop an important department of business research which business men will learn to utilize and support. In this way we may effect a marriage between the business and academic worlds which should be fruitful in its issue.

Meantime, however, the business man can only get from such a source broad indications of the general position. If the reader has accepted the line of thought in earlier chapters he will agree that much more than this is needed, and that very much may be hoped from a more detailed application of these principles we are discussing to the particular industry and the individual business. General barometers, or a series of general barometers directed to different aspects of the broad economic position, only go so far. They must be supplemented by work done in the light of the particular circumstances of the particular business. Only in this way can the outside perspective be combined with the inside knowledge.

How this is to be done in practice is often a somewhat difficult problem. In a big business it will pay to employ a special man or a special department simply to do this work. In a smaller business the finance director, or his equivalent, may perhaps be able to give that special study which the subject demands. Where this is not practicable, and in particular in the case of small businesses, it may be possible to arrange for at least a part of the work to be done by the trade association on behalf of the industry, or by an *ad hoc* organization on behalf of a group of the more progressive firms. Work done in this way on the right lines and by the right men will undoubtedly be profitable. The difficulty will be to find the men who combine with the necessary economic and statistical training the judgment and sense of business realities, without which the application of the theories of forecasting, in their present undeveloped stage, may be dangerous.

To conclude, then. Forecasting is not an adequate substitute for efficiency in other directions. It is still in the pioneer stage, and any business barometer must be used intelligently in the light of all the available economic facts. There is no "typical" cycle. One must be prepared to modify conclusions as a result of events which cannot be foretold, as, for instance, general strikes. It is much more difficult to apply during abnormal periods like this, when the war floods have not fully subsided and old landmarks are gone, or at least are not yet visible. Nevertheless, when all these necessary reservations and qualifications have been made, business forecasting does offer material help to the progressive business man.

One word more on a wider theme, directed to British readers. Britain, with all her defects, has a wonderful history to her credit in all fields of human endeavour. For long she was the unchallenged industrial leader of the world. Young and virile nations have now challenged her leadership and some have passed her on the road. The war has left her with immense difficulties. Exhausted though she may be by her efforts, she can hope for no opportunity for repose. In the field of international competition no quarter is given. Only in proportion as she continues as a great industrial nation can she hold her place in the councils of the nations and offer that standard of life to her people which we desire. Only in proportion as she can equal her competitors in efficiency can she hope to continue a great industrial nation. In such matters, if a nation does not go forward, it must go back. If Britain cannot take up the challenge, she will sink as other nations have sunk before.

She has no wish to shirk the challenge. She is facing her problems valiantly, as her critics admit. She has the finance, the character, the reputation, the tradition, the craftsmanship, the goodwill. Whether she will succeed, and the extent to which she will succeed, will depend upon how far she can add to those qualities a greater breadth of outlook and more imagination. It is starkly true in this, as in other cases, that "without vision the people perish." With that "more flexible . . . more far-seeing outlook" for which Colonel Willey pleads—with that greater keenness and broader sympathy which vision gives—she will rise to the occasion now as she has always done before. She will not only maintain her footing in the field of efficiency, but make a great contribution in that more difficult sphere of human relationship where already she has achieved so much.

It is in the belief that business forecasting is just one aid to her endeavour which cannot safely be neglected, and in the hope that some of her business men may be persuaded to explore the possibilities of the subject, that this little book has been written. It is a small tribute laid at the feet of the "Old Mother."

APPENDIX I

SOURCES OF INFORMATION

For a business man who feels that some study of external trade statistics is desirable, the first thing should be to become a subscriber to one of the Economic or Statistical Services mentioned in the text. In the case of Great Britain, this means the London and Cambridge Economic Service. The annual subscription is £6, and the office is at the London School of Economics. This Service is managed by a committee representing the London School of Economics and the Cambridge Department of Economics, with the addition of a representative of the Federation of British Industries, and is run in co-operation with the Harvard University Committee on Economic Research. The Service issues, in addition to memoranda on specific subjects, a monthly bulletin dealing with the main business statistics relating to Great Britain, and giving an index chart on the lines illustrated in Fig. 8. In addition, it gives, monthly, similar but less detailed information on business in the U.S.A., Canada, France, Germany, Italy and Russia. Furthermore, it undertakes to answer any specific statistical inquiries from subscribers.

Those who wish to gather information on British conditions for themselves, and those who wish to supplement the London-Cambridge Service, will have to seek in diverse directions. *British Industries*, the organ of the Federation of British Industries, provides a quarterly economic survey and forecast. The *Economist* offers valuable material, in particular in its " Monthly Trade Survey." It, too, offers to answer specific inquiries. The *Times Trade Supplement* and *Manchester Guardian Commercial* are indispensable. Certain daily newspapers are giving increasing attention to trade matters. It has always been considered essential for a newspaper of any standing to have a Financial or City Editor, and to offer several columns of material in each issue bearing on financial problems. It is beginning to be realized now that there are probably more people interested in commerce and industry than in finance. The *Daily News*, for example, now has its Trade Editor, and offers admirable "Trade Surveys," while the *Daily Express* has a business research department. The Joint Labour Research Department of the Labour Party and Trade Union Congress issues useful statistics and reports.

Each of the "Big Five" banks now has its monthly circular, where readers will find, in addition to treatment of the financial problems peculiarly the province of the banks, very useful reports from different districts or different industries, as the case may be. Valuable statistics on banking and on the prices of securities will be found in the *Bankers' Magazine*.

Amongst official periodicals, the monthly *Ministry of Labour Gazette* deals with important material bearing on labour relations, and in addition gives every month detailed figures on unemployment, poor law relief, wages, cost of living, and so on. The weekly *Board of Trade Journal* gives similar information relating to trade, including weekly details of coal production. Figures with regard to production are scarce and are unfortunately limited to those industries showing the greatest cyclical variation. Coal has been mentioned. Quarterly figures on shipbuilding are published by Lloyd's. Figures of iron and steel are published by the Federation of Iron and Steel Manufacturers. A monthly Index of Production distinguishing home and export trade has recently been commenced by the electrical industry, and is quoted in the *Economist* monthly. The London-Cambridge Service has recently worked out its own quarterly and annual Production index covering industry in general. It also incidentally publishes Professor Bowley's Monthly Index of Wage Rates. These last two indices are referred to above.

There is a mine of largely undiscovered information in annual and other periodical reports of British Government Departments. From 1922 onwards, the Government has commenced to issue very capable annual *Guides to Current Official Statistics.* These constitute an index to all statistical information contained in official documents published each year from 1922 onwards.

The last Census was in 1921, and the whole of the material is now available. Valuable figures on population will be found in the general Census volume. Very full and detailed information will be found in the separate county volumes. Such reports as those of the Board of Inland Revenue contain, for the diligent seeker, a great many useful figures on the national income and on taxable articles. Imports and exports, and other related statistics, are given in the Trade and Shipping Returns. As regards foreign markets, there is an admirable annual series on every important foreign country published by the Department of Overseas Trade. These reports suffer from the usual disadvantage of official publications, in being usually considerably out of date before they become available, but the Department will always, on request, supply current information calculated to assist the development of British foreign trade. A similar service in this (as well as in other directions) is provided by the Federation of British Industries for its members.

A Census of Production was taken in respect of 1924, which should yield very valuable figures on British Industry and on the wages paid, when the figures become available. The only previous published census was in 1907, intermediate ones having been interfered with by the war.

This is just a brief reference to outstanding sources of statistics on British trade. Anyone following up these suggestions will soon discover other sources having reference to his particular interests.

When we turn to American statistics, we find them in almost bewildering variety. Americans and Canadians will probably be quite as familiar with them as the writer. British readers should, as a starting-point, procure a copy of the monthly *Survey of Current Business*, published by the U.S. Department of Commerce, and from that remarkable starting-point develop their acquaintance with the statistical material available in the U.S.A. Information in this *Survey* will be found not only under every heading mentioned in this book, but in many other directions; for example, prices, production, and consumption of all important products, stocks of raw materials, and finished goods, sales of mail-order houses, chain stores and department stores, and so on. Besides official Government publications, there are those of the Federal Reserve Board, of the big banks and of important and valuable research institutions, like the National Bureau of Economic Research, the National Industrial Conference Board, and so on. In addition, there are the Harvard, Babson, Brookmire, and other economic and statistical services which have already been mentioned.

Extensive official statistics are published by the Canadian Government both monthly and annually. The London-Cambridge Service also, as stated, has a monthly report on Canada. Dutch, French, German, Italian, Swiss, and other governments, also issue valuable statistics and statistical studies on their respective countries. In the international sphere should be mentioned the monthly *International Labour Review* of the International Labour Office, which includes, in addition to articles, valuable index figures of wages, cost of living and unemployment in different countries. A monthly bulletin of statistics is published by the League of Nations, as well as various valuable *ad hoc* publications. The International Institute of Agriculture in Rome, the International Institute of Commerce at Brussels, and the International Institute of Statistics at The Hague publish valuable statistics.

As regards books on this subject, one is rather in a difficulty. Almost every book on economics, statistics, unemployment, or business management, has some bearing on the subject, but it would be impossible to give elaborate references to these here. On the other hand, the books specifically directed to the present limited subject are few ; and so far as I know, there is none by a British author.

The following is a brief note on some American books more or less directly related to our present topic. Professor Wesley Mitchell's monumental work on business cycles is unfortunately out of print.

1. *Business Forecasting*, by Professor David F. Jordan, of New York University, published by Prentice-Hall Inc. (1921), (257 pages, price $5). This is a close and able analysis of the business cycle in all its aspects, written from the point of view of the professional economist.

2. *The Problem of Business Forecasting*, edited by Warren M. Persons, William Trufant Foster, and Albert J. Hettinger, Jun., and published by the Houghton Mifflin Company for the Pollak Foundation of Economic Research (1924) (311 pages, price $4). This volume, developed from certain papers presented at the eighty-fifth annual meeting of the American Statistical Association, " deals with the statistical basis for analysing current economic problems for the purpose of making forecasts of business activities." It includes some well-known names among its contributors. It is for the expert rather than the general reader.

3. *Business, and Investment Forecasting*, by Ray Vance, the President of the Brookmire Economic Service, and published by that Service (Second Edition, 1926, price $1). This is a readable and ably-written little book intended for the business man and the student. It deals in general terms with the principles of forecasting and with the preparation and use of business statistics, but naturally devotes particular attention to the Brookmire Service. The writer, in the recognition of the work of others and in other directions, displays the open and balanced mind of genuine scientific inquiry.

4. *Budgetting to the Business Cycle*, by Joseph H. Barber, published by the Ronald Press Company, New York (1925) (price $1.25). This is a detailed and well-illustrated statement of the application of business cycle technique to an individual American business, the Walworth Company, and the results achieved. Mr. Barber is a recognized authority in America on this subject.

5. *Economic Control of Inventory*, by the same author, published by the Codex Book Company, New York City (price $2).

6. *Business Annals*, recently published by the National Bureau of Economic Research, New York City (1926) (price $4) is claimed to

be the first history of business cycles on a world-wide scale. It is said to give in compact form the experiences of seventeen countries of business booms and slumps dating, in the case of U.S.A. and Great Britain, from 1790 to 1925. It would appear from the description to be a very valuable book of reference. A copy has not reached the present author at the time of writing.

Laymen who wish to devote some attention to statistical theory may be referred to Professor Bowley's books, *An Elementary Manual of Statistics* (price 7s. 6d.), and the more advanced work, *Elements of Statistics* (price 18s.), to Udny Yule's *An Introduction to the Theory of Statistics* (price 12s. 6d.), and to Wilford I. King's *The Elements of Statistical Method* (Macmillan Company, New York, price 6s.).

APPENDIX II

GRAPHIC METHODS

THERE is a tendency to sneer at the "charting habit." Undoubtedly, like every good thing, it can be overdone. Undoubtedly, it can be used to cover up the poverty of material behind it, or deliberately to mislead the mind of the reader. One is familiar with the type of chart in a newspaper advertisement showing, let us say, the growth of sales of a certain product. The growth appears to be extraordinarily rapid; the curve of sales rises at a strikingly steep angle. What is not made clear to the reader is that the base of the chart does not begin at zero, but, let us say, at 99, and that the growth per annum which so impresses us is from 100 to 105!

Nevertheless, graphic representation of everyday business facts can be a very real aid, first in enabling us to grasp a complicated situation, and secondly in pointing to practical solutions.

Statisticians, accountants, and others, who look upon figures as their daily bread, acquire an almost uncanny capacity for grasping and retaining the full effect of a complex series of figures. They can actually visualize the figures themselves. However, even they have their limitations, while the ordinary business executive, faced with the task of assimilating many tables of figures, either gives it up as a bad job or only achieves his end after an expenditure of time and thought which he can ill afford. The truth is that figures are primarily the medium for calculation and not for the presentation of a complex situation. They have to be "presented" in a way in which first they can be seen in a bird's-eye view; and secondly can be compared with other series. This is the case for graphic presentation. That it can have a very direct bearing on executive action is illustrated by the case of a big

American meat-packing company. The executive in question, finding it difficult to grasp the complicated figures on transport costs put before him, had them put into graphic form. At once it was evident to any observer that the high transport charges about which complaint was being made were due to certain long haulages of return empties. The decision was at once taken to find a return freight; and fruit-canning businesses were successfully started at appropriate points to take advantage of the cheap return journey.

It would be out of place here to go into any detail about methods of graphic presentation. Books are available on the subject and are supplemented by innumerable articles. Some slight idea of the uses to which charts can be put will be obtained from some of the illustrations in this book. What is suggested is that the business man who is still sceptical about these " new-fangled notions " should take up some series of figures which are presented to him regularly in figures only, and should attempt himself to put them into simple graphic form, and then consider how far, by so doing, he is assisted to a clearer perception of their full meaning and of their relationship to other facts. I am confident that he will then be sufficiently interested and impressed to make further inquiries as to the best methods of handling different types of statistics. For the guidance of the novice, and for the sake of securing greater uniformity amongst those who are no longer novices, there are set out below certain suggestions on graphic presentation. These are the recommendations of a representative committee called together at the invitation of The American Society of Mechanical Engineers, and sitting under the chairmanship of Mr. Willard C. Brinton. They are reproduced here by their courteous permission.

1. The general arrangement of a diagram should proceed from left to right.

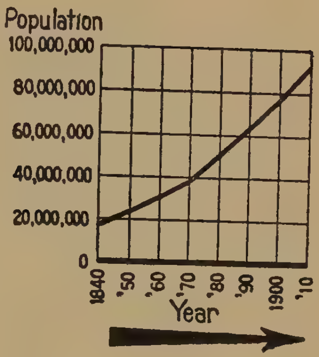


FIG. 1

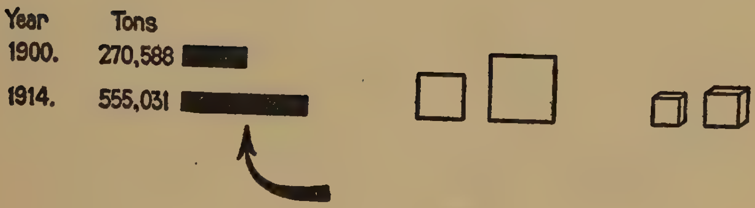


FIG. 2

2. Where possible represent quantities by linear magnitudes, as areas or volumes are more likely to be misinterpreted.

3. For a curve the vertical scale, whenever practicable, should be so selected that the zero line will appear on the diagram.

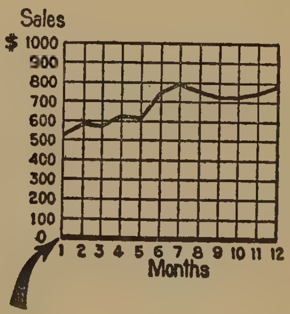


FIG. 3

4. If the zero line of the vertical scale will not normally appear on the curve diagram, the zero line should be shown by the use of a horizontal break in the diagram.

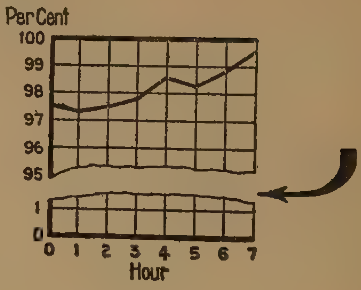


FIG. 4

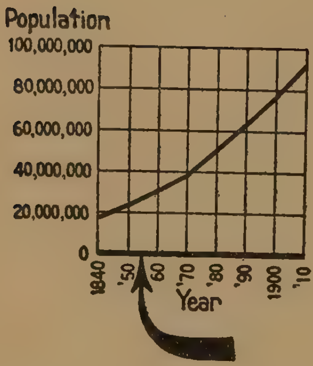


FIG. 5A

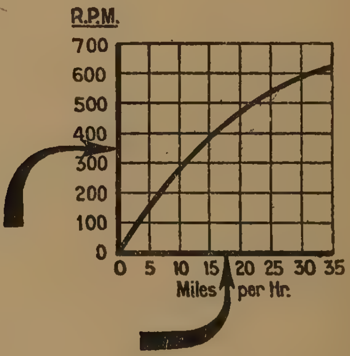


FIG. 5B

5. The zero lines of the scales for a curve should be sharply distinguished from the other co-ordinate lines.

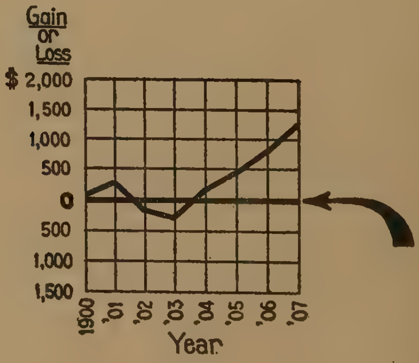


FIG. 5C

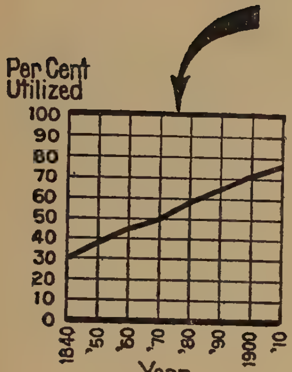


FIG. 6A

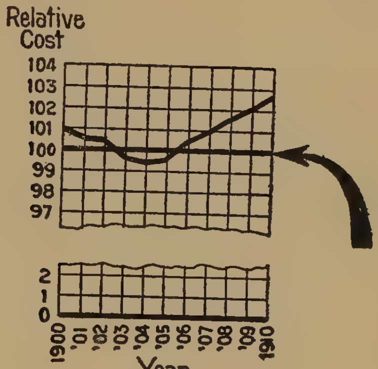


FIG. 6B

6. For curves having a scale representing percentages, it is usually desirable to emphasize in some distinctive way the 100 per cent line or other line used as a basis of comparison.

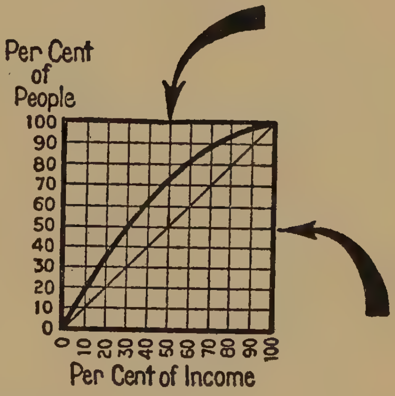


FIG. 6C

7. When the scale of a diagram refers to dates, and the period represented is not a complete unit, it is better not to emphasize the first and last ordinates, since such a diagram does not represent the beginning or end of time.

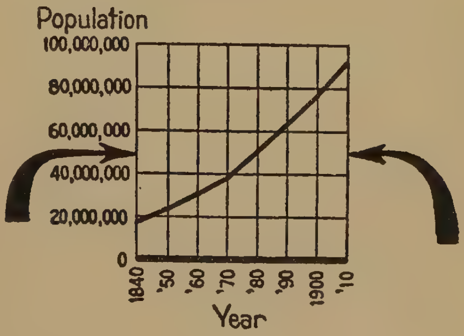


FIG. 7

8. When curves are drawn on logarithmic co-ordinates, the limiting lines of the diagram should each be at some power of ten on the logarithmic scales.

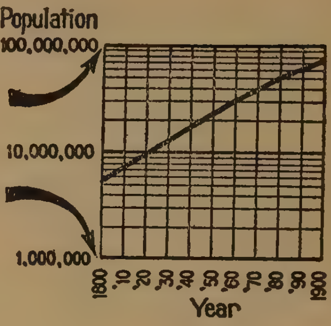


FIG. 8

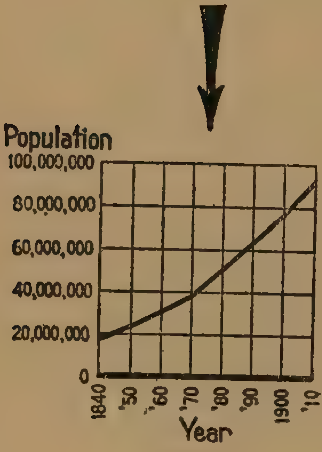


FIG. 9A

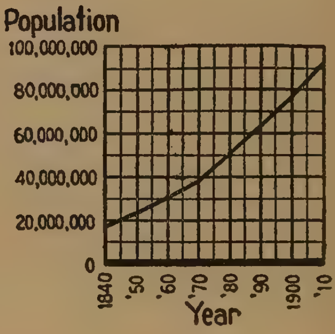


FIG. 9B

9. It is advisable not to show any more co-ordinate lines than necessary to guide the eye in reading the diagram.

10. The curve lines of a diagram should be sharply distinguished from the ruling.

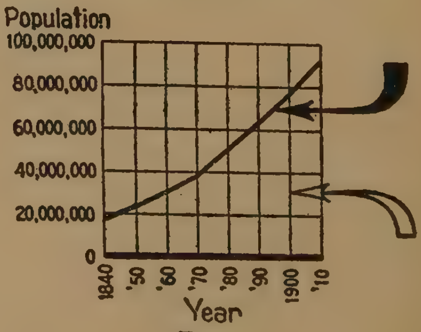


FIG. 10

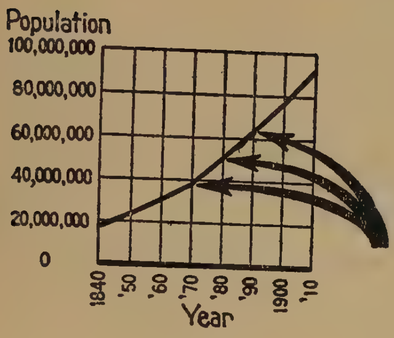


FIG. 11A

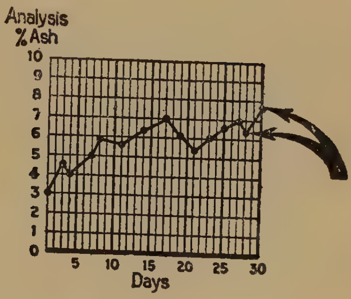


FIG. 11B

11. In curves representing a series of observations, it is advisable, whenever possible, to indicate clearly on the diagram all the points representing the separate observations.

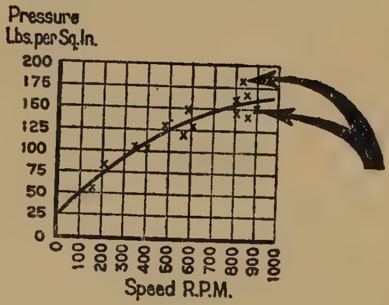


FIG. 11C

12. The horizontal scale for curves should usually read from left to right and the vertical scale from bottom to top.

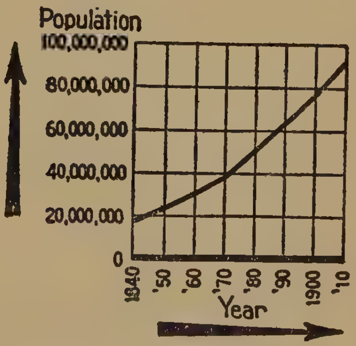


FIG. 12

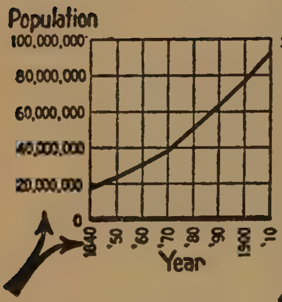


FIG. 13A

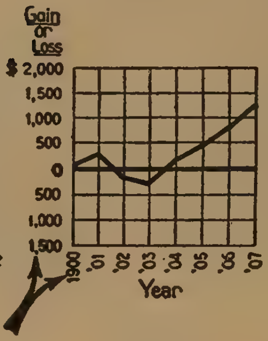


FIG. 13B

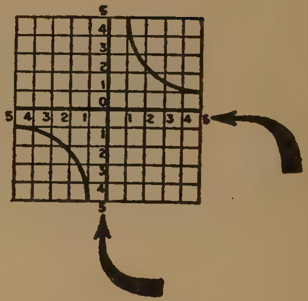


FIG. 13C

13. Figures for the scales of a diagram should be placed at the left and at the bottom or along the respective axes.

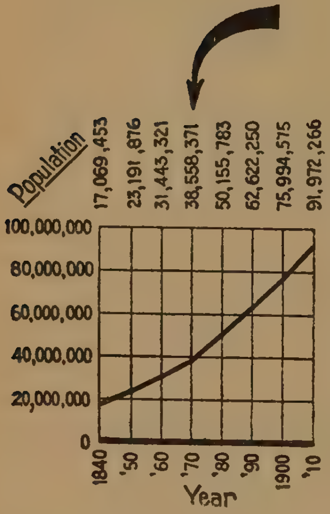


FIG. 14A

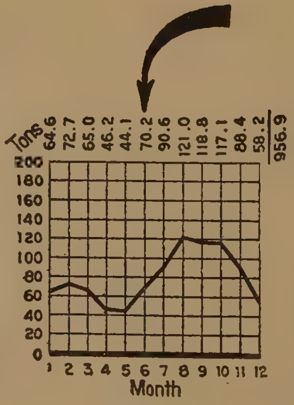


FIG. 14B

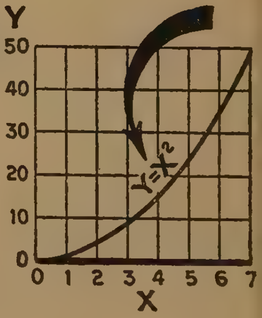
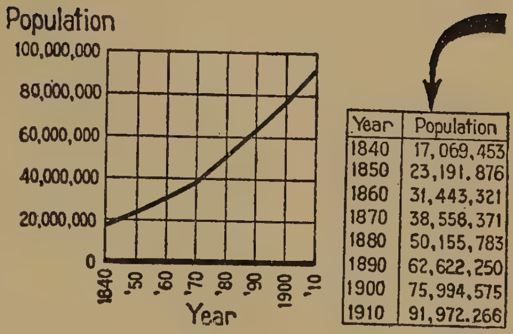


FIG. 14C

14. It is often desirable to include in the diagram the numerical data or formulae represented.

15. If numerical data are not included in the diagram it is desirable to give the data in tabular form accompanying the diagram.



Year	Population
1840	17,069,453
1850	23,191,876
1860	31,443,321
1870	38,558,371
1880	50,155,783
1890	62,622,250
1900	75,994,575
1910	91,972,266

FIG. 15

16. All lettering and all figures on a diagram should be placed so as to be easily read from the base as the bottom, or from the right-hand edge of the diagram as the bottom.

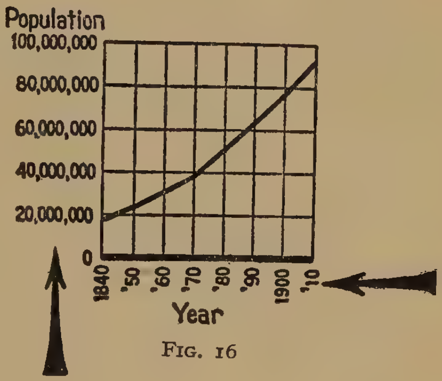
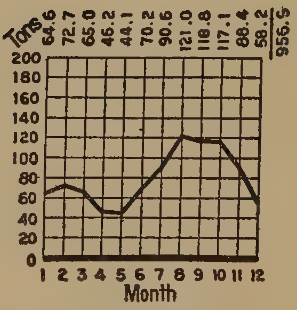


FIG. 16

17. The title of a diagram should be made as clear and complete as possible. Sub-titles or descriptions should be added if necessary to ensure clearness.



Aluminium Castings Output of Plant No. 2, by Months, 1914.

Output is given in short tons.

Sales of Scrap Aluminium are not included.

FIG. 17

One word more may perhaps be added on the subject of semi-logarithmic, or ratio, charts, the advantages of which do not seem to be sufficiently appreciated by business men. One of these is illustrated opposite paragraph 8, page 108.

It will be noted that the characteristic of this ratio chart is that each unit in the vertical scale is represented by a shorter distance from the base than the previous unit. In the illustration mentioned the distance from one million to two millions is obviously greater than from two to three, and so on. It follows that this is not a suitable chart on which to compare *absolute* values. Its purpose, as its name implies, is to compare the *ratio* between one factor and another. Accordingly, equal vertical distances represent equal *percentage* variations. If the two series to be compared vary little from one another, an ordinary chart may be adequate. If, however, they vary substantially, a ratio chart is desirable and may be essential. An increase of 100 on a base of 100 is an increase of 100 per cent, just in the same way as 10,000 is on 10,000; but on an absolute scale, the latter will appear one hundred times as great.

Suppose one is considering the probable future price of a staple commodity. One wishes to compare world production and consumption, over, say, a series of twenty years. The probability is that the two lines follow one another very closely, crossing and re-crossing. In these circumstances, an ordinary chart may sufficiently show the relationship between the two; though difficulty may arise if there has been a very rapid increase in volume in the period. In such latter case, either the chart will have to be very large, or, on the necessarily small scale adopted, the earlier figures will be very obscure. This difficulty can be met by using a ratio chart where the earlier figures (when, say, the production was in the hundred thousands) will be on a much larger scale than the later (when the figures are running into millions). Here the absolute height of the curves is not of moment; what we are concerned with is the relationship between the two.

If now we attempt to introduce into our calculations a third series of figures representing stocks of the commodity, a ratio chart becomes almost indispensable if the reader is not to be misled. We may observe that stocks are two million tons to-day and were only one million tons ten years ago, and therefore conclude that as stocks have doubled, supplies must be ample. If, however, consumption has doubled in the same period, the ratio which a two million stock bears to current consumption is the same as a one million stock did ten years ago; and it is this ratio which we have to take into account in considering the bearing of stocks on future prices.

Ratio charts have many uses in statistical work. Perhaps, however, sufficient has been said to introduce the ratio chart to business men who have not previously met it.

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